

P
Agric
I

Imperial Agricultural Research
Institute, Delhi

July 1911.

Chemical Series

Vol. II, No. 1

Biological
& Medical
Series

Memoirs of the Department of Agriculture in India

THE COMPOSITION OF THE MILK OF SOME BREEDS
OF INDIAN COWS AND BUFFALOES
AND ITS VARIATIONS

PART I

THE MILK OF SOME BREEDS OF INDIAN COWS

BY

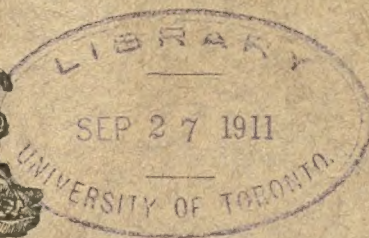
A. A. MEGGITT, B.Sc.

Agricultural Chemist to the Government of Eastern Bengal and Assam

AND

HAROLD H. MANN, D.Sc.

Agricultural Chemist to the Government of Bombay



AGRICULTURAL RESEARCH INSTITUTE, PUSA

PUBLISHED BY

THE IMPERIAL DEPARTMENT OF AGRICULTURE IN INDIA

BY

THACKER, SPINK & CO., CALCUTTA

W. THACKER & CO., 2, CREED LANE, LONDON

Price, Re. 1-8

STORAGE

MEMOIRS OF THE
DEPARTMENT OF AGRICULTURE
IN INDIA

CHEMICAL SERIES

VOL. II



AGRICULTURAL RESEARCH INSTITUTE, PUSA

PUBLISHED FOR
THE IMPERIAL DEPARTMENT OF AGRICULTURE IN INDIA

Boe Bo temp
BY
THACKER, SPINK & CO., CALCUTTA
W. THACKER & CO., 2, CREED LANE, LONDON

CALCUTTA :
PRINTED BY THACKER, SPINK AND CO.

CONTENTS.

VOL. II.

	PAGE.
No. 1. MEGGITT, A. A., and MANN, H. H. The Composition of the Milk of some Breeds of Indian Cows and Buffaloes and its Variations. Part I. The Milk of some Breeds of Indian Cows (with 2 charts)	1
No. 2. LEATHER, J. W. Records of Drainage in India (with 4 charts)	63
No. 3. MANN, H. H., JOSHI, N. V., and KANITKAR, N. V. The " <i>Rab</i> " System of Rice Cultivation in Western India ...	141
No. 4. MEGGITT, A. A., and MANN, H. H. The Composition of the Milk of some Breeds of Indian Cows and Buffaloes and its Variations. Part II. The Milk of some Breeds of Indian Buffaloes (with 2 charts)	195
No. 5. HARRISON, W. H., and RAMA SWAMI SIVAN, M. R. A Contribution to the Knowledge of the Black Cotton Soils of India (with 4 plates)	261
No. 6. ANNETT, H. E. The Date Sugar Industry in Bengal. An Investigation into its Chemistry and Agriculture (with 9 plates and 5 charts)	281



Digitized by the Internet Archive
in 2008 with funding from
Microsoft Corporation

July 1911

CHEMICAL SERIES

Vol. II, No. 1

MEMOIRS OF THE DEPARTMENT OF AGRICULTURE IN INDIA

THE COMPOSITION OF THE MILK OF SOME BREEDS
OF INDIAN COWS AND BUFFALOES
AND ITS VARIATIONS

PART I

THE MILK OF SOME BREEDS OF INDIAN COWS

BY

A. A. MEGGITT, B.Sc

Agricultural Chemist to the Government of Eastern Bengal and Assam

AND

HAROLD H. MANN, D.Sc

Agricultural Chemist to the Government of Bombay



AGRICULTURAL RESEARCH INSTITUTE, PUSA

PUBLISHED FOR

THE IMPERIAL DEPARTMENT OF AGRICULTURE IN INDIA

BY

THACKER, SPINK & CO., CALCUTTA

W. THACKER & CO., 2, CREED LANE, LONDON

PRINTED BY
THACKER, SPINK & CO., CALCUTTA.

THE COMPOSITION OF THE MILK OF SOME BREEDS OF INDIAN COWS AND BUFFALOES AND ITS VARIATIONS.

PART I.

THE MILK OF SOME BREEDS OF INDIAN COWS.

BY

A. A. MEGGITT, B.Sc.,

Agricultural Chemist to the Government of Eastern Bengal and Assam,

AND

HAROLD H. MANN, D.Sc.,

Agricultural Chemist to the Government of Bombay.

INTRODUCTION.

THE data in existence with regard to the composition of the milk of Indian cows and buffaloes are extremely incomplete, and little if any can be found as to the relationship between the yield of milk obtained, and its composition. The facilities existing at Poona for investigating these relationships are probably excelled nowhere in India. At the Government dairy farm there is a herd of over one hundred animals kept under commercial conditions for the supply of milk to the Poona hospitals and civil population. In addition, since the establishment of the laboratory of the Agricultural Chemist to the Government of Bombay in close proximity, there exists an opportunity for completing the data obtainable, by frequent analysis of the milk produced. The present paper is confessedly only a preliminary one on the subject; it is merely concerned with the composition of the milk of each of a number of cows and buffaloes taken, whenever the animals were in milk, twice each week (one morning and one evening milking) for a period of

about fifteen months. Furthermore, at present, we have only been able to consider the percentages of total solids and fat in each case.

Before going, however, into the details of the methods employed and the results obtained it may be well to review the information which is already in existence on the subject of the present paper. So far as we have been able to ascertain, there are practically no reliable analyses to be had apart from a series published by Dr. Leather in 1901.* He based his results on analyses of the milk of individual animals belonging to the herd at the Poona (Bombay), and Saidapet (Madras) dairies. In the former case the cows' milk examined came from individuals belonging to both the Sind and Aden breeds as well as from crossbred animals. The buffaloes' milk was obtained from individuals of the Jaffarabadi and Surti breeds. In the case of the Saidapet (Madras) herd, only cows' milk was examined and the breed of the animals is not stated. It will be advisable to give a summary of Leather's results in his own words as follows:—

“Firstly, as to Indian cows' milk. It is found to differ in no essential particulars from that met with in Europe. The relation existing between the specific gravity, the solids-not-fat, and the fat agree well in all cases with those which Richmond and others have found in the case of milks from English cows. So also the relationship between the milk-sugar, the proteids, and the mineral matter agrees well with the proportions 13 : 9 : 2. The percentage of butter-fat is high, varying from 4 to 6. Indian cows' milk is invariably very nearly white and the butter very pale yellow, unless coloured artificially.

“Secondly, as to buffaloes' milk. It will be seen that the majority of the samples are characterised by an extraordinarily high proportion of butter-fat, 7 and 8 per cent. being common, and in one case close on 10 per cent. of fat was found. Buffaloes' milk is white and the butter is also usually quite white.

“The relation existing between the specific gravity, the solids-not-fat, and the fat is the same as for cows' milk, the solids-not-fat,

* Analyst, Vol. XXVI (1901), page 40.

when calculated by Richmond's formula, agreeing well with those found by analysis.

“The percentage of proteids in buffaloes' milk is distinctly higher than in cows' milk, and varies from 3.5 to 4.3 per cent. The percentages of milk-sugar and mineral matter correspond very closely with those of cows' milk. On the other hand, the relationship between these three ingredients is not the same as for cows' milk. In one particular sample (that of the mixed milk of the herd) the percentage of proteids was higher than I found in most of the individual milks; but this does not materially alter the fact. If one takes the mean figures, the relationship works out to about 10 : 12 : 2. It is probable that the proportion of proteids is necessarily higher in a milk containing so much butter-fat, in order that the albuminoid ratio may be maintained.”

These results obtained by Dr. Leather, which, as we have said, are practically the only data in existence with regard to the composition of Indian milks, are clear, and we have relied on them in all the analyses quoted in the present paper so far as they relate to cows' milk. The question of the relationship between the constituents of buffaloes' milk will be discussed in Part II of the present paper. It is evident, from them, that little error is introduced if the solids-not-fat are calculated, in the cows' milk, from determinations of specific gravity and fat, by Richmond's formula, and we have, hence, adopted this method throughout. This formula seems to apply very fairly to Indian cows' milk.

In other respects our methods of analyses have been those ordinarily in use. The fat has always been determined by the “Gerber” method; the specific gravity has been taken in the fresh milk, cooled, by the lactometer and the results calculated to a temperature of 15.5° C. where necessary. Where the milk had to be kept for a few hours for the fat determination, it was preserved by means of potassium bichromate.

There is a difficulty in obtaining fair samples of the milk produced by Indian cows and buffaloes, which does not occur elsewhere but which is a real one here. In India, it is the universal custom

to allow the calf to suck a certain amount of milk from the mother before taking what is wanted. So universal is this custom that it is impossible in most cases to get the cow to give its milk unless the calf has already had its share. This will naturally tend to show the composition of the milk as somewhat different from what it really is, making it appear slightly richer, while it will also tend to reduce the record below the actual yield. It has been impossible to eliminate this difficulty entirely. The most that could be done was to arrange that on the occasion when the samples were taken the calf should have as little as possible.

The object in view in the investigations now reported has been to ascertain, with regard to Indian cows and buffaloes, how the yield and composition of milk were related to one another, and how each was influenced by season, by weather conditions, by the period of lactation reached by an animal, by the food which the animal was receiving, by the age of the animal wherever possible, and by any other factor which was capable of observation and measurement. This is a big programme, and it must be recognised, as has already been indicated, that the present paper is essentially a preliminary one, and that several factors are entirely ignored.

It is obvious, however, that in attempting to carry out a long series of examinations such as is reported in the present paper, accurate results could only be obtained by the close co-operation and help of a number of people. To all these we venture to express our deep sense of obligation. Mr. J. B. Knight, the director of the dairy, very kindly allowed us to use any animal on the farm for our purposes, and to make use of any of the dairy records. The superintendent of the dairy (Captain Todd) went to considerable trouble in many cases to help us in the work, and in all cases gave every assistance in his power. Our own assistant, Mr. A. M. DeMello, who has been in charge of the routine work both of the obtaining and examination of the samples, has devoted himself, during the whole of the fifteen months to which the succeeding records apply, to the subject with energy and zeal which has largely given to the results now reported such value as they may possess.

I.

THE MILK OF INDIAN COWS.

The herd of cows at the Poona Dairy is principally composed of animals of the 'Gir' and 'Sind' breeds, and the material in this paper almost entirely refers to those two breeds. Before turning to the individual records, it is interesting to give the fat percentages in the mixed milk of the dairy during a long period. Leather (*loc. cit.*) has already given complete analyses of the mixed dairy milk of both the Poona and Saidapet dairies which indicate fat percentage as follows:—

Source.	Date.	Percentage of fat.
Poona Dairy	February 2, 1899	4.75
Do.	February 28, "	4.91
Saidapet Dairy ...	March 29, 1900	4.00
Do.	April 4, "	4.14

In this case we have no indication of whether this milk was produced in the morning or in the evening milking.

In the present experiments, determinations of fat were made separately in the average morning milk and in the average evening milk on a varying number of days in each month from the beginning of February 1908 to the end of January 1909. It will not be necessary to quote the whole of the figures obtained, but in the first place we may give the average composition, so far as fat is concerned, for each month:

Average composition of milk of Cows of the Poona Dairy Herd.

DATE.	Number of samples.	PERCENTAGE OF FAT.	
		Morning milk.	Evening milk.
January, 1908	6	3.98	5.30
February, "	19	4.10	5.20
March, "	22	4.34	5.30
April, "	15	4.50	5.40
May, "	18	4.40	5.20
June, "	13	4.20	5.20
July, "	5	4.59	4.90
August, "	5	5.00	5.00
September, "	10	5.00	5.10
October, "	12	4.50	5.10
November, "	7	4.90	5.10
December, "	12	4.80	5.85
January, 1909	12	4.70	5.77*
Average	156		

* Nine samples only.

In considering these results the first thing which strikes the observer is the extreme constancy of the results. All the morning milks have between 4 and 5 per cent. of fat : all the evening milks between 4.9 and 5.9 per cent. This is probably what would have been expected in a mixed herd, but at first sight it does appear a little remarkable that the changes in weather from cold to extreme heat, and from extreme dryness to the excessive moisture of the rainy season should not have had more effect on the concentration of the milk. It might, on the face of things, perhaps have been expected that during the rainy season in July, August, and September that the concentration of the milk should decline, and so the percentage of fat decrease, but there is certainly no trace of this in our figures.

The difference always noticed in the relative composition of the evening and the morning milking of European cows is also found in that of the cows of the Poona herd. The evening milk is always richer than that of the morning. The differences are as follows :—

DATE.	Excess of fat in evening milk over the morn- ing milk.
	Per cent.
January, 1908	1.32
February, ..	1.10
March, ..	.96
April, ..	.90
May, ..	.80
June, ..	1.07
July, ..	.40
August, ..	.90
September, ..	.10
October, ..	.60
November, ..	1.70
December, ..	1.05
January, 1909	1.30

These figures seem to indicate very clearly that the difference between the concentration of the evening and the morning milk is less during the rainy season (July to October) than it is during the other parts of the year.

While, however, as we have said, the composition of the milk throughout the year exhibits a rather remarkable constancy, yet the variations from day to day are very considerable, and would

seem to indicate that daily changes in weather or food exercise a greater effect on the concentration of the milk than the larger and more gradual changes in conditions from month to month. We will give the detailed daily analyses for three months as examples, —the figures for the whole year being hardly called for in the present connection. The figures given are for February 1908 (cold weather), May 1908 (hot weather) and September 1908 (rains):—

PERCENTAGE OF FAT.			PERCENTAGE OF FAT.		
DATE.	DATE.		DATE.	DATE.	
	Morning.	Evening.		Morning.	Evening.
1908.			1908.		
February 3	2.90	6.00	May, 1	4.10	6.80
Do. 4	4.20	5.30	Do. 4	4.50	5.20
Do. 5	3.90	5.50	Do. 6	4.90	5.50
Do. 6	4.80	5.50	Do. 7	6.20	6.40
Do. 7	3.50	5.10	Do. 8	5.60	5.80
Do. 10	4.60	5.50	Do. 11	4.20	5.50
Do. 11	4.80	5.80	Do. 12	4.60	5.60
Do. 12	4.00	5.20	Do. 13	4.10	5.10
Do. 14	4.20	5.20	Do. 14	5.30	5.40
Do. 17	4.20	5.50	Do. 15	4.10	5.30
Do. 18	4.50	4.90	Do. 18	4.00	5.50
Do. 19	4.00	4.50	Do. 19	4.10	4.80
Do. 20	3.80	5.30	Do. 20	4.20	5.00
Do. 21	4.00	5.10	Do. 21	3.60	4.90
Do. 24	3.60	5.40	Do. 22	3.70	4.90
Do. 25	4.00	4.20	Do. 25	3.80	5.00
Do. 26	4.90	5.00	Do. 26	4.50	5.00
Do. 27	4.00	5.00	Do. 27	4.40	4.20
Do. 28	4.00	5.60			

We will discuss more in detail the apparent causes for these large daily variations when considering the milk of individual cows.

To these figures we may add a few complete analyses of the mixed milk of the whole Kirkee herd of cows, which very fairly

represent the class of milk which should be turned out by an Indian dairy composed of cows alone.

	September 26, 1907.	October 3, 1907.	October 10, 1907.	October 17, 1907.	October 24, 1907.	November 7, 1907.	November 14, 1907.
	Percent.	Percent.	Percent.	Percent.	Percent.	Percent.	Percent.
Water ..	84.98	85.06	85.80	85.45	85.44	85.39	84.81
Fat ..	5.80	5.75	5.30	5.75	5.50	5.80	5.80
Proteids ..	3.54	3.56	3.60	3.60	3.54	3.55	3.80
Milk-Sugar ..	4.92	4.87	4.53	4.41	4.74	4.52	4.83
Ash ...	0.76	0.76	0.77	0.79	0.78	0.74	0.76
Total Solids	100.00	100.00	100.00	100.00	100.00	100.00	100.00
"Solids not fat" ..	15.02	14.94	14.20	14.55	14.56	14.61	15.19
Specific Gravity at 60 F.	1.030		1.030	1.029	1.030	1.0295	

II.

We may now turn to the consideration of the milk of individual cows. The observations to be recorded were confined to the cows of the 'Gir' and 'Sind' breeds, of which the Poona Dairy chiefly consists. These were, of course, at the commencement, in various stages of lactation, and it was resolved to merely make the observations up to the conclusion of the period of lactation then in progress. In a few cases, however, a portion of the next period of lactation is also included. The yields of milk were obtained from the dairy records. Samples of milk were taken every Friday, both the morning and evening milk of that day being examined. The fat was determined in the 'Gerber' machine, the specific gravity was taken by a hydrometer, and the total solids were calculated by Richmond's formula; where it was necessary to keep the milk for more than a few hours, it was preserved by means of potassium bichromate.

The data so obtained, which apply to eight 'Gir' cows, and to twelve 'Sind' cows, enable us to discuss the following questions for cows of the two breeds concerned:—

- (1) The relationship of the yield of milk by an individual cow to the richness of the milk.

- (2) The relationship of the yield and composition of the milk of an individual cow to the period of lactation.
- (3) The relationship of the yield and composition of the milk of cows to the weather conditions, that is to say, to the temperature, and humidity.
- (4) The variation which may normally be expected to occur in the composition of the milk of healthy animals of one breed kept under similar conditions.

It may here be stated that the cows had green fodder all the year round, even during the height of the hot weather. As the dairy is situated on a farm to which perennial irrigation is applied, this condition of things is easily obtained, and enables the effect of any very large reduction in the amount of green succulent food to be eliminated.

Most of the questions here suggested have been fairly well solved for animals belonging to European breeds and kept in Europe and America, but there are practically no data on the subject so far as Indian cows are concerned. We will, therefore, now consider the light which our results shed on the questions here proposed.

III.

The Relationship of the Yield of Milk given by individual Cows and the Richness of the Milk.

'Gir' Cows.—It will be first of interest to ascertain how the average composition of the milk of a number of Gir cows varies with the yield, but in this matter the data we can give are only limited. The observations were started on eight cows, but some of these quickly became dry, and so reduced the number. The results which follow are given during the period when there were still four cows remaining in milk: with a less number than this we conceive that average figures are useless. The yield is shown for the week ending on the date given.

Date.	Number of cows.	Weekly yield of milk.	Average yield per cow.	COMPOSITION OF MORNING MILK.		COMPOSITION OF EVENING MILK.	
				Fat.	Total solids.	Fat.	Total solids.
1907.		lb., ozs.	lb., ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September 26	8	364 4	45 8	5.0	13.8	5.7	14.4
October 3	8	346 4	43 4	4.7	13.4	6.1	14.6
Do. 10	7	301 12	43 2	4.7	13.8	5.1	13.9
Do. 17	7	302 4	43 3	4.6	12.5	5.9	14.7
Do. 24	7	299 8	42 12	5.1	14.0	6.1	14.9
Do. 31	7	290 8	41 8	5.2	14.6	6.3	15.4
November 7	6	253 4	42 3	4.9	14.2	6.3	15.2
Do. 14	6	258 4	43 1	5.2	14.1	6.2	15.0
Do. 21	5	221 4	44 4	5.4	14.2	5.9	14.7
Do. 28	5	208 4	41 10	5.2	14.4	6.4	15.3
December 5	4	193 4	48 5	6.0	15.6	7.0	16.5
Do. 12	4	175 0	43 12	6.0	15.2	6.7	15.9
Do. 19	4	169 12	42 7	5.5	14.6	6.4	15.4
Do. 26	4	173 0	43 4	...			
1908							
January 2	4	142 0	35 8				
Do. 9	4	148 12	37 3			7.1	16.4

On account of the small number of cows, we are not inclined to insist on the figures later than the end of November, or after the number of milks analysed falls below five.

These results of the examination of the average composition of the mixed milks of the 'Gir' cows do not show any very close relationship between the fat percentage and the yield. It would naturally be expected that as the yield diminishes, the milk would become richer. This, while occurring sometimes, does not happen by any means uniformly, and in one or two cases (notably on October 10th and on November 21st) the evening and the morning milk seem to tell in different directions. We shall have to approach this question, it is evident, by considering the milk of the individual cows.

As has already been said, the number of 'Gir' cows whose milk is under consideration is eight. The yield for each week and the result of the analysis of each sample is set out at the end of this paper. At present we shall endeavour to summarise the results in connection with each cow. The following tables indicate the average composition when the yield varies between certain limits in the case of each animal.

Cow No. 1.—(*Kagali*).

Calved—May 7th, 1907. Became dry—January 13th, 1908.

Yield for the week.	FAT PERCENTAGE.	
	Morning milk.	Evening milk.
Between 40 and 50 lbs. (2 weeks)	5.2	6.3
Do. 30 and 40 „ (6 „)	5.2	6.7
Do. 20 and 30 „ (4 „)	5.7	6.9

GIR Cow No. 2.—(*Nabadi*).

Calved May 4th, 1907. Became dry—December 4th, 1907.

Yield for the week.	FAT PERCENTAGE.	
	Morning milk.	Evening milk.
Between 30 and 40 lbs. (3 weeks)	5.2	8.1
Below 20 lbs.* (8 weeks) „		6.1

* In seven of these cases the cow was only milked once a day.

GIR Cow No. 3.—(*Mukaran*).

Calved—February 26th, 1907. Became dry—December 2nd, 1907.

Yield for the week.	FAT PERCENTAGE.	
	Morning milk.	Evening milk.
Between 20 and 30 lbs. (4 weeks)	4.1	4.9
Below 20 lbs.* (5 weeks)	4.2	4.7

* Results are only given where there were both evening and morning milkings.

GIR Cow No. 4.—(*Umbari*).

Calved—June 22nd, 1907. Became dry—April 7th, 1908.

Yield for the week.	FAT PERCENTAGE.	
	Morning milk.	Evening milk.
Between 80 and 90 lbs. (5 weeks)	4.6	5.5
Do. 70 „ 80 „ (7 „)	5.5	6.3
Do. 60 „ 70 „ (6 „)	5.6	6.7
Do. 50 „ 60 „ (3 „)	5.9	5.7
Do. 20 „ 30 „ (2 „)	5.0	6.4
Below 20 lbs.* (3 weeks)	5.8	6.1

* Results are only given where there were both evening and morning milkings.

GIR COW No. 5.—(*Pavali*).

Calved—February 25th, 1907. Became dry—May 3rd, 1908.

Yield for the week.	FAT PERCENTAGE.	
	Morning milk.	Evening milk.
Between 70 and 80 lbs. (1 week)	4.7	4.0
Do. 60 .. 70 .. (8 weeks)	4.8	6.0
Do. 50 .. 60 .. (5 ..)	5.6	6.4
Do. 40 .. 50 .. (7 ..)	5.1	5.9
Do. 30 .. 40 .. (4 ..)	5.9	5.7
Do. 20 .. 30 .. (3 ..)	5.6	5.8
Below 20 lbs. (3 weeks)	6.3	6.6

* Only two samples are included in this average.

GIR COW No. 6.—(*Godi*).

Calved—January 27th, 1907. Became dry—January 23rd, 1908.

Yield for the week.	FAT PERCENTAGE.	
	Morning milk.	Evening milk.
Between 60 and 70 lbs. (3 weeks)	5.0	6.2
Do. 50 .. 60 .. (5 ..)	5.3	5.9
Do. 40 .. 50 .. (3 ..)	5.7	6.2
Do. 30 .. 40 .. (2 ..)	5.9	7.0

GIR COW No. 7.—(*Mahali*).

Calved—June 13th, 1906. Became dry—November 6th, 1907.

Calved—March 19th, 1908.

Yield for the week.	FAT PERCENTAGE.	
	Morning milk.	Evening milk.
Between 80 and 90 lbs. (1 week)	6.6	6.5
Do. 70 .. 80 .. (6 weeks)	5.8	6.3
Do. 60 .. 70 .. (11 ..)	5.8	6.0
Do. 50 .. 60 .. (9 ..)	5.8	6.0
Do. 40 .. 50 .. (2 ..)	6.1	6.3
Do. 30 .. 40 .. (2 ..)	6.0	6.2
Do. 20 .. 30 .. (5 ..)	6.4	6.9
Below 20 lbs. (2 weeks)	6.3	6.8

GIR Cow No. 8.—(*Budhi*).

Calved—December 6th, 1906. Became dry—October 3rd, 1907.

Calved—March 10th, 1908.

Yield for the week.				FAT PERCENTAGE.	
				Morning milk.	Evening milk.
Above 130 lbs.	...	(7 weeks)	..	6.2	6.4
Between 120 and 130 lbs. (5 weeks)				6.1	6.4
Do.	110 ..	120 ..	(3 ..)	6.3	6.7
Do.	100 ..	110 ..	(1 week)	6.2	6.1
Do.	90 ..	100 ..	(3 weeks)	6.1	6.2
Do.	80 ..	90 ..	(3 ..)	6.3	6.9
Do.	70 ..	80 ..	(7 ..)	5.9	6.2
Do.	50 ..	60 ..	(3 ..)	5.7	6.4
Do.	40 ..	50 ..	(1 week)	4.8	5.6
Below 30 lbs. (1 week)				4.6	4.4

The results thus set out present several interesting features. The first of these is extraordinary constancy, week by week, of the composition of the milk of each individual cow, whatever the amount of milk it is giving. The second is the enormous variation, within the limits of selected cows of one breed, in the richness of the milk of different cows. In one case (Cow No. 3) the milk, although at the end of a milking period and hence at its best, is only about the average of European cows, while most of the others even when yielding the largest amounts of milk are very much richer and contain almost six per cent. of fat.

Any relationship between the quantity of milk and the richness in fat is not very obvious, except perhaps when the cow is becoming dry. At this time there seems to be a tendency for the milk to get richer, as is indicated best by Cow No. 7. Even this is not very clear, however, with the other animals. Apart from this one fact, however, there is no evidence that with the same animal,

under natural dairy conditions, there is any connection between the milk yield and its richness in fat among animals of the 'Gir' breed.

'Sind' Cows.—We may now turn to a consideration of the points which we have already discussed for 'Gir' cows, in connection with those of the 'Sind' breed. Here again it will be advisable to consider first the average composition of the milk of a number of such cows. The observations commenced with twelve cows. Some of these, as before, quickly became dry, and so the number of animals to which the records refer varies. The average figures which follow are only given so long as at least four cows remained in milk.

ANALYSIS OF MILK.									
Date 1907.		Number of cows.	Weekly yield of milk.		Average yield per cow per week.	MORNING MILK.		EVENING MILK.	
						Fat.	Total solids.	Fat.	Total solids.
			lbs. ozs.	lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.	
Sept.	26	...	11	615 12	56 0	5.4	14.8	5.8	15.6
Oct.	3		11	608 8	55 4	5.4	14.6	5.7	14.5
Do.	10	...	11	585 12	53 4	5.1	14.4	5.6	14.7
Do.	17	...	11	605 4	55 0	5.6	15.1	5.9	15.1
Do.	24		11	618 8	59 0	5.3	14.5	6.0	15.4
Do.	31		11	676 0	61 8	5.0	15.4	6.1	15.7
Nov.	7		12	659 12	60 0	5.4	15.1	6.1	16.7
Do.	14		11	738 0	67 0	5.5	15.1	5.8	15.3
Do.	21		11	669 12	61 0	5.9	15.2	6.0	15.3
Do.	28		11	631 0	57 8	5.3	15.0	5.9	14.9
Dec.	5	...	11	608 0	55 4	5.7	15.3	5.9	15.6
Do.	12		10	607 4	60 8	5.8	15.5	6.4	16.0
Do.	19		10	560 4	56 0	5.8	15.2	6.1	15.3
Do.	26		10	566 8	56 12				
1908.									
Jan.	2		10	553 4	55 4				
Do.	9		9	518 12	57 12	6.1	15.7	6.5	15.9
Do.	16		9	552 8	61 8	5.3	14.3	6.3	15.7
Do.	23		9	536 12	59 12	5.8	15.1	6.3	16.1
Do.	30		9	511 8	56 12	5.8	15.4	6.4	16.1
Feb.	6		9	509 0	55 8	5.7	15.2	6.3	16.1
Do.	13	...	8	490 8	61 4	6.1	16.0	6.3	15.8
Do.	20		9	554 8	61 8	5.9	15.7	6.3	16.2
Do.	27	...	8	570 12	71 4	5.6	15.2	5.8	15.6
Mar.	5		8	605 0	75 8	5.3	14.8	5.4	15.2
Do.	12		8	624 12	78 0	6.2	16.1	5.9	15.7
Do.	19		8	602 8	75 4	6.8	16.6	5.9	15.5
Do.	26	...	8	576 12	72 0	5.1	14.4	5.6	14.7
Apr.	2		7	446 12	63 12	6.3	15.8	6.4	15.7
Do.	9		8	577 4	72 4	6.1	15.9	6.4	15.7
Do.	16	...	9	679 12	75 8	6.6	15.7	6.8	16.2
Do.	23		9	678 12	75 8	6.4	16.2	6.6	16.1
Do.	30		9	706 0	78 8	6.6	16.4	7.0	16.7

Date 1908.		Number of cows.	Weekly yield of milk.	Average yield per cow per week.	ANALYSIS OF MILK			
					MORNING MILK.		EVENING MILK.	
					Fat.	Total solids.	Fat.	Total solids.
			lbs. ozs.	lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.
May 7		10	759 8	76 0	6.2	15.9	6.3	15.9
Do. 14		9	787 4	87 8	6.2	15.8	6.6	16.3
Do. 21		9	760 12	84 8	6.1	15.8	6.6	16.4
Do. 28		9	727 4	81 0	6.1	15.8	6.2	15.9
June 4		9	645 0	71 12	5.9	14.9	6.3	15.7
Do. 11		8	617 12	77 4	5.7	14.7	6.4	15.6
Do. 18	...	8	635 4	79 8	6.5	15.9	6.5	16.0
Do. 25		8	644 4	80 8	6.2	15.7	6.2	15.2
July 2		8	643 1	80 8	6.1	15.3	6.3	15.4
Do. 9		8	611 0	76 4	6.3	15.1	6.4	15.7
Do. 16	...	8	587 0	73 4	5.7	14.7	6.1	15.3
Do. 23		7	556 4	79 8	6.1	15.4	6.4	15.7
Do. 30		7	540 12	77 4	6.0	15.1	6.0	15.3
Aug. 6		7	508 0	72 8	5.8	15.1	6.2	15.5
Do. 13		7	518 0	71 0	6.3	15.7	6.5	16.0
Do. 20		7	507 4	72 8				
Do. 27		7	470 12	67 4				
Sept. 3		6	418 4	69 12				
Do. 10		6	400 12	66 12	6.1	15.0	6.4	15.8
Do. 17		6	397 0	66 4	6.4	15.7	6.4	15.6
Do. 24		6	396 12	66 0	6.3	16.0	6.5	15.8
Oct. 1		5	335 12	67 4	6.1	15.2	6.4	15.2
Do. 8		6	365 0	60 12	5.4	14.8	6.0	14.8
Do. 15		6	362 0	60 4	6.5	15.8	6.7	15.8
Do. 22		6	356 0	59 4	6.5	16.1	6.5	15.8
Do. 29		6	322 12	53 12	6.0	14.9	5.9	14.9
Nov. 5		5	317 0	63 4	6.0	15.1	6.5	15.6
Do. 12		5	301 8	60 4	6.1	15.4	6.4	15.4
Do. 19		5	278 12	55 12	5.5	14.1	6.2	15.2
Do. 26		5	276 0	55 4				
Dec. 3		5	263 12	52 12				

In making out this list, the extreme end of the milking period, when the cow did not give sufficient milk to justify two milkings per day, has in every case been omitted. But excluding the few days when this happens, the principal result which the above figures show, is the extraordinary constancy of the composition of the milk from a number of 'Sind' cows. This is shown even more clearly in the following table which is summarised from that above given :

Weekly yield of milk per cow.		Number of weeks of observation.	ANALYSIS OF MILK.			
			MORNING MILK.		EVENING MILK.	
			Fat.	Total solids.	Fat.	Total solids.
			Per cent.	Per cent.	Per cent.	Per cent.
50-60 lbs.	...	15 weeks.	5.7	15.0	6.1	15.4
60-70 lbs.		16 "	5.9	15.3	6.3	15.6
70-80 lbs.		19 "	6.1	15.5	6.2	15.7
80-90 lbs.		5 "	6.1	15.7	6.4	15.8

It seems perfectly clear that in the same group of cows a larger milk yield does not mean a poorer milk with this breed of cows. When the yield of milk was the largest, the composition was as good as at any time during the milking period.

We must now turn to the consideration of the variations in the composition of the milk of individual cows as the yield changes. The number of 'Sind' cows whose milk is under consideration is twelve, and the results of the analysis of each sample are set out at the end of this paper. We may, however, summarise the results for each animal as before, and the following tables indicate the average composition when the yield varies between certain limits in the case of each cow:—

SIND COW No. 1.—(*Bulakhi*).

Calved—May 25th, 1907. Became dry—July 22nd, 1908.

Yield for the week.				FAT PERCENTAGE.	
				Morning milk.	Evening milk.
Between 60 and 70 lbs.	(4 weeks)			5.7	6.1
Do. 50 " 60 "	(15 ")			5.6	6.1
Do. 40 " 50 "	(12 ")			6.4	6.6
Do. 30 " 40 "	(3 ")			6.0	6.5
Do. 20 " 30 "	(4 ")			6.6	6.6
Below 20 lbs.	(4 ")			6.6	6.6

SIND COW No. 2.—(*Sukhi*).

Calved—June 14th, 1907. Became dry—May 7th, 1908.

Yield for the week.				FAT PERCENTAGE.	
				Morning milk.	Evening milk.
Between 70 and 80 lbs.	(1 week)	...		5.4	5.7
Do. 60 " 70 "	(7 weeks)			5.7	6.5
Do. 50 " 60 "	(3 ")	..		6.2	6.9
Do. 40 " 50 "	(11 ")			6.0	6.8
Do. 30 " 40 "	(8 ")	—		7.0	7.0
Do. 20 " 30 "	(1 week)			6.0	5.9

SIND COW NO. 3.—(*Kanaya*).

Calved—April 19th, 1907. Became dry—December 18th, 1907.

Calved—April 9th, 1908.

Yield for the week.		FAT PERCENTAGE.	
		Morning milk.	Evening milk.
Between 70 and 80 lbs. (1 week)		6.0	6.1
Do.	60 „ 70 „ (1 „)	6.4	6.8
Do.	50 „ 60 „ (4 weeks)	6.6	6.4
Do.	40 „ 50 „ (3 „)	6.0	6.4
Do.	30 „ 40 „ (4 „)	6.4	6.4
Do.	20 „ 30 „ (8 „)	5.9	5.9
Below 20 lbs. (13 weeks)		6.2	6.4

SIND COW NO. 4.—(*Putali*).

(In the case of this cow the period for which the observations lasted is so short that a summary brings out no important points. The individual figures are recorded at the end of this paper.)

SIND COW NO. 5.—(*Hansmi*).

Calved—November 27th, 1906. Became dry—March 3rd, 1908.

Calved—May 4th, 1908.

Yield for the week.		FAT PERCENTAGE.	
		Morning milk.	Evening milk.
Between	100 and 110 lbs (2 weeks) ...	6.6	6.6
Do.	90 „ 100 „ (5 „) ...	6.3	6.5
Do.	80 „ 90 „ (8 „)	6.2	6.6
Do.	70 „ 80 „ (6 „)	6.1	6.6
Do.	60 „ 70 „ (2 „)	6.8	6.2
Do.	50 „ 60 „ (6 „)	5.6	6.5
Do.	40 „ 50 „ (6 „)	5.9	6.5
Do.	30 „ 40 „ (6 „) ...	5.9	6.6
Do.	20 „ 30 „	6.4	7.3

SIND COW No. 6.—(*Bhasmi*).

Calved—February 14th, 1907. Became dry—February 28th,
1908.

Calved—April 1st, 1908.

Yield for the week.			FAT PERCENTAGE.	
			Morning milk.	Evening milk.
More than 110 lbs.	(3 weeks)	..	5.6	6.2
Between 100 and 110 lbs.	(6 ..)	..	6.1	6.8
Do. 90 .. 100 ..	(5 ..)	..	5.4	5.9
Do. 80 .. 90 ..	(7 ..)	..	6.3	6.6
Do. 70 .. 80 ..	(7 ..)	...	5.1	6.3
Do. 60 .. 70 ..	(8 ..)	..	5.8	6.2
Do. 50 .. 60 ..	(6 ..)	..	5.9	7.0
Do. 40 .. 50 ..	(1 ..)	..	6.9	7.6
Do. 30 .. 40 ..	(3 ..)	..	6.8	7.8
Do. 20 .. 30 ..	(1 ..)	..	6.9	7.3

SIND COW No. 7.—(*Pitambari*).

Calved—December 9th, 1906. Became dry—February 8th,
1908.

Calved—February 9th, 1908.

Yield for the week.			FAT PERCENTAGE.	
			Morning milk.	Evening milk.
Over 150 lbs.	(3 weeks)	..	5.8	6.0
Between 140 and 150 lbs.	(1 week)	..	5.4	5.6
Do. 130 .. 140 ..	(4 weeks)	..	5.1	5.0
Do. 120 .. 130 ..	(9 ..)	..	5.9	6.0
Do. 110 .. 120 ..	(5 ..)	..	5.5	5.3
Do. 100 .. 110 ..	(2 ..)	..	6.0	6.1
Do. 80 .. 90 ..	(5 ..)	..	6.6	6.5
Do. 70 .. 80 ..	(3 ..)	..	6.0	6.1
Do. 50 .. 60 ..	(5 ..)	..	4.8	5.1
Do. 40 .. 50 ..	(5 ..)	..	4.0	4.7
Do. 30 .. 40 ..	(5 ..)	..	5.1	4.8
Do. 20 .. 30 ..	(1 week)	..	6.2	5.6
Below 20 lbs.	(3 weeks)	..	5.4	..

In this case the figures for the lower yields seem extraordinary and in conflict with those obtained for other animals. It should be noted, however, that all the lower yields (below 50 lbs.) are recorded from the first milking period during which this cow was under observation: all the yields above 60 lbs. per week were recorded in the second milking period.

SIND Cow No. 8.—(*Piri*).

Calved—December 8th, 1906. Became dry—October 5th, 1907.

Calved—November 11th, 1907.

Yield for the week.				FAT PERCENTAGE.	
				Morning milk.	Evening milk.
Over 100 lbs.		(3 weeks)		5.3	5.5
Between 90 and 100 lbs.		(4 ")		5.4	5.6
Do. 80 " 90 "		(17 ")		5.9	6.0
Do. 70 " 80 "		(7 ")		6.2	6.6
Do. 60 " 70 "		(6 ")		6.2	6.1
Do. 50 " 60 "		(3 ")		6.1	6.7
Do. 40 " 50 "		(7 ")		6.4	6.1
Do. 30 " 40 "		(2 ")		5.8	5.3

SIND Cow No. 9.—(*Zankar*).

Calved—November 27th, 1906. Became dry—September 4th, 1908.

Calved—September 6th, 1908.

Yield for the week.				FAT PERCENTAGE.	
				Morning milk.	Evening milk.
Between 130 and 140 lbs.		(4 weeks)		4.8	4.7
Do. 120 " 130 "		(7 ")		4.6	4.9
Do. 110 " 120 "		(6 ")		5.1	4.8
Do. 100 " 110 "		(8 ")		5.9	5.5
Do. 90 " 100 "		(6 ")		5.3	5.7
Do. 80 " 90 "		(5 ")		6.3	6.2
Do. 70 " 80 "		(1 week)		5.2	5.7
Do. 60 " 70 "		(4 weeks)		5.6	5.3
Do. 50 " 60 "		(2 ")		5.0	5.8
Do. 30 " 40 "		(2 ")		5.0	5.0

SIND Cow No. 10.—(*Khilari*).

Calved—March 17th, 1907.

In milk all the time.

Removed from the farm, March 25th, 1908.

Yield for the week.				FAT PERCENTAGE.	
				Morning milk.	Evening milk.
Over 90 lbs.		(3 weeks)		6.4	5.8
Between 80 and 90 lbs.		(1 week)		5.0	6.3
Do. 70 " 80 "		(1 ")		7.3	8.4
Do. 50 " 60 "		(1 ")		6.6	7.8
Do. 40 " 50 "		(9 weeks)		6.7	7.2
Do. 30 " 40 "		(9 ")		6.5	7.7

SIND COW No. 11.—(*Soni*).

Calved—May 31st, 1907. Became dry—June 8th, 1908.

Calved—September 12th, 1908.

Yield for the week.		FAT PERCENTAGE.	
		Morning milk.	Evening milk.
Between 90 and 100 lbs. (2 weeks)	...	4.6	5.0
.. 80 .. 90 .. (4 ..)	...	4.8	4.9
.. 70 .. 80 .. (10 ..)	...	4.7	5.3
.. 60 .. 70 .. (9 ..)	...	5.5	5.6
.. 50 .. 60 .. (4 ..)	...	6.2	6.5
.. 40 .. 50 .. (2 ..)	...	5.5	5.9
.. 30 .. 40 .. (1 week)	...	7.4	8.3
.. 20 .. 30 .. (2 weeks)	...	5.5	6.6

SIND COW No. 12.—(*Mohan*).

Calved—March 23rd, 1907. Calved again—April 17th, 1908.

Yield for the week.		FAT PERCENTAGE.	
		Morning milk.	Evening milk.
Between 110 and 120 lbs. (2 weeks)	...	6.6	7.0
Do. 100 .. 110 .. (5 ..)	...	5.6	6.5
Do. 90 .. 100 .. (7 ..)	...	6.5	6.5
Do. 80 .. 90 .. (4 ..)	...	6.3	6.7
Do. 70 .. 80 .. (3 ..)	...	6.6	6.9
Do. 60 .. 70 .. (11 ..)	...	5.3	6.2
Do. 50 .. 60 .. (6 ..)	...	5.3	5.8
Do. 40 .. 50 .. (7 ..)	...	5.7	6.2
Do. 30 .. 40 .. (5 ..)	...	5.9	5.9
Do. 20 .. 30 .. (4 ..)	...	6.1	6.6

The conclusions which can be drawn from the figures now set out in detail are very similar to those already drawn from a similar examination of the milk of 'Gir' cows. The composition of the milk of a particular animal is still not obviously in close correlation

with the amount which it is yielding. There is perhaps on the whole a slight tendency for the milk to be richer when in smaller quantity (see Cows Nos. 1, 2, 6, 8 and 11), but this is not always the case, for in certain animals (Cows Nos. 3 and 12) the yield and richness seem to decline together. But on the whole the average composition of the milk of the same cow when yielding different quantities is very constant.

As with the 'Gir' cows the milk is on the whole richer than that of European cows, and this is equally the case when the yield is high as when the amounts obtained are small.

It would seem that any relationship between yield and composition is dominated by some other factor. The nature of this factor we shall discuss later.

IV.

The Relationship of the Yield and Composition of Milk given by individual Cows and the period of Lactation.

When we proceed to a consideration of the question of the relationship of the yield and composition of the milk of cows to the period of lactation a very great difficulty is found in drawing satisfactory conclusions, owing to the difference in the length of the lactation periods, and the periods of the year during which the cows were in milk. Of course, the length of the lactation period is itself very largely determined by the time at which the cow is again served by the bull, so that any attempt to decipher the relationship which we are now discussing is beset with difficulties. We do not pretend we have got over these difficulties, but the results are, at any rate, interesting.

Gir Cows.—The periods of lactation were extraordinarily variable in extent, even with the same animal, and among the eight cows under consideration varied from twenty-seven weeks to seventy-three weeks in two individual cases. The following table shows the length of the lactation for every calving since 1906 in the case of these animals; the date of calving, and of subsequent service being shown in each case.

Cows.	Date of calving.	Date of service.	Length of Lactation. Weeks.	Time after calving that the cow was served. Weeks.
No. 1	April 2, 1906 ...	July 7, 1906 ...	38	14
	May 7, 1907 ...	" 24, 1907 ...	36	11
	May 9, 1908 ...	November 11, 1908 ...	35	25
" 2	May 4, 1907 ...	November 21, 1907 ...	31	29
	August 19, 1908 ...	Not served	30	..
" 3	February 26, 1907 ...	July 3, 1907 ...	40	18
	May 21, 1908 ...	October 21, 1908 ...	46	22
	July 19, 1909 ...	November 26, 1909 ...	38	18
" 4	June 22, 1907 ...	" 11, 1907 ...	41	20
" 5	February 25, 1907 ...	" 22, 1907 ...	62	39
	September 4, 1908 ...	Not served	30	..
" 6	January 27, 1907 ...	July 24, 1907 ...	52	26
	May 5, 1908 ...	December 6, 1908 ...	57	31
" 7	June 13, 1906 ...	..	73	..
	March 19, 1908 ...	September 12, 1908 ...	42	25
	June 19, 1909 ...	" 5, 1909 ...	38	11
" 8	December 6, 1906 ...	May 29, 1907 ...	43	25
	March 10, 1908 ...	July 31, 1908 ...	44	20
	May 9, 1909 ...	August 5, 1909 ...	27	13

From these figures it would not appear as if either the season of calving, or the length of time after calving that service took place had very material effects on the length of the lactation period. For four out of seven animals for which we have records of more than one lactation period, the length of the milking did not vary to any very great extent with the same animal. With the other three, however (Nos. 5, 7 and 8), the variation was extraordinary and so far we have quite failed to make out the reason for it. Putting aside the extraordinary lengthening or shortening of the milking period in these cases, at present unaccounted for, it may be said, however, that with these *Gir* cows the normal lactation period, when served at any stage while in milk, varies from thirty to a little over fifty weeks. The averages are as follows:—

No. 1 (3 Milking periods)	36 weeks.
No. 2 (2 Milking periods)	30.5 weeks.
No. 3 (3 Milking periods)	41 weeks.
No. 6 (2 Milking periods)	54.5 weeks.
No. 7* (2 Milking periods)	49 weeks.
No. 8† (2 Milking periods)	43.5 weeks.

or the average (again omitting the exceptional cases) for the breed is 40.5 weeks.

* Omitting one extraordinary long period of 75 weeks.

† Omitting one extraordinary short period of 27 weeks.

We may now turn to the yield at various stages of the milking period. And here we have decided to eliminate the question of the absolute length of the milking period, and simply give the figures of yield for every tenth of the whole time, whatever that may be. We have only got the figures for one lactation period in each case, but that will enable us to see clearly how the yield varies.

The following are the figures :—

		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
Total number of weeks		36	31	40	42	61	53	42	44
Number of weeks after calving that the animal was served.		2	29	18	...	39	25½		25
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
First tenth of milking period.		274½	155½	363½	416½	288½	347½	219	327½
Second ditto		263½	149½	393½	340½	356½	423½	224	550½
Third ditto		244½	171½	340½	330½	413½	540½	315½	603½
Fourth ditto		204½	191½	300½	334½	471½	474½	292½	559½
Fifth ditto	...	177½	146½	272½	333½	418½	439½	274	465
Sixth ditto		146½	127½	195½	298½	399½	357½	279½	404½
Seventh ditto		124½	111½	144½	262½	341½	322½	237	361½
Eighth ditto		100½	50½	103½	264½	292½	302½	219½	292½
Ninth ditto		74½	36½	76½	204½	218½	200	150½	197½
Tenth ditto		42½	19½	59½	57½	158½	68	112½	123½
Total yield		1,653	1,157½	2,244½	2,841½	3,398½	3,475	2,323½	3,881

These results, it will be seen at once, are somewhat irregular. In two cases, the first tenth of the lactation period yielded the largest amount of milk, in one case the second tenth, in three cases the third tenth, and in two cases the fourth tenth. After this point the yield uniformly declined for the remainder of the lactation whatever were the circumstances of the particular case.

The general average for the whole of the eight cows is as follows :—

First tenth of the milking period	299½ lbs.
Second „ „ „ „	337½ lbs.
Third „ „ „ „	369½ lbs.
Fourth „ „ „ „	353½ lbs.
Fifth „ „ „ „	318½ lbs.
Sixth „ „ „ „	276 lbs.
Seventh „ „ „ „	238 lbs.
Eighth „ „ „ „	203 lbs.
Ninth „ „ „ „	146½ lbs.
Tenth „ „ „ „	79 lbs.

When we turn to the relation of the composition of the milk to the period of lactation our figures are by no means so complete, because the analyses were in many cases only conducted through a portion of one or two milking periods. The actual figures of the analyses are shown in the tables at the end of the paper, but if we divide the milking period into tenths as we have done above in discussing the yield, the figures which follow are obtained for each cow. The results have only been calculated for the fat percentage which is given for both the morning and evening milk.

FAT PERCENTAGE IN MILK OF GIR COWS.

		1		2		3		4		5		6		7	
		M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.
First tenth of milking period		...													
Second	ditto													5.8	6.7
	ditto													5.8*	5.9
Third	ditto			...										6.0	6.2
	ditto													5.9	6.0
Fourth	ditto													5.8	6.0
	ditto													6.4	6.6
Fifth	ditto							4.4	5.4					6.0	6.1
	ditto							5.2	5.9	4.4*	4.6*			5.9	6.2
Sixth	ditto	5.2*	6.3*					5.7	6.6	4.8	6.3			5.6	5.9*
	ditto							5.3*	6.2*	5.5*	6.2*	5.0*	5.9*	5.7	6.0
Seventh	ditto	5.0	6.1	5.1*	8.0*			5.3*	6.2*	5.5*	6.2*	5.0*	5.9*	5.7	6.0
	ditto							5.3*	6.2*	5.5*	6.2*	5.0*	5.9*	5.7	6.0
Eighth	ditto	5.3	7.1	5.9*	5.8	4.1	4.8*	5.8	6.8	5.4	6.1*	5.5	6.1	5.9	5.9
	ditto							5.3	6.0	5.3	6.6	5.8	6.9	6.2	6.3
Ninth	ditto	6.1	6.9		6.3	4.1	4.7	5.5	6.0	5.3	6.6	5.8	6.9	6.2	6.3
	ditto							5.8	6.2	5.7	6.2			...	...
Tenth	ditto							5.8	6.2	5.7	6.2			...	...

* This asterisk indicates that figure does not represent a complete tenth of the period of lactation.

The figures thus reported do not seem to indicate any constant relationship of the composition to the period of lactation of the cows. Again the individuality of the cow seems to be the dominant factor, and, apart from one or two abnormal cases, the milk seems to have a very similar composition during the whole of the milking period. There is the usual difference between morning and evening milk, and the relationship of the two does not vary constantly at different periods.

Sind Cows.—We can now turn to see whether these conclusions hold equally with the twelve Sind cows included in our records.

In this case too the periods of lactation were also very variable in length, varying from twenty-seven to sixty-one weeks. This variation is not so wide as that observed in the case of the Gir cows though it is very considerable. Generally speaking the periods of lactation were longer than in the previous case, a fact in accordance with usual experience.

The following table shows the length of the lactation for every calving since 1906 among the twelve cows in question.

Cows,	Date of calving,	Date of service,	Length of Lactation, Weeks,	Time after drying that the cow was served, Weeks,
No.				
1	May 25, 1907 ..	November 20, 1907	60	25
	August 20, 1908 ..	No record ..	No record.	No record.
2	June 20, 1907 ...	November 24, 1907	46	22
	September 7, 1908	No record ..	57	No record.
3	April 19, 1907	July 2, 1907	34	10
	April 9, 1908	No record ..	32	
4	May 6, 1907	July 6, 1907 ...	27	9
5	November 27, 1906	July 15, 1907 ...	66	33
	May 4, 1908	No record ..	94	
6	February 14, 1907	No record ..	54	
	March 25, 1908	No record ..	65	
7	December 9, 1906	May 4, 1907 ...	61*	21
	February 9, 1908	No record ..	57*	
8	December 8, 1906	January 24, 1907	43	7
	November 5, 1907	April 29, 1908 ...	64	2
	September 14, 1906	No record ..	43	
9	September 10, 1907	December 4, 1907	54	12
	September 6, 1908	March 9, 1909 ...	58	26
10	March 17, 1907 ...	June 17, 1907 ...	48	13
	February 23, 1908	No record ..	48	
11	May 31, 1907	No record ..	53	
	September 12, 1908	No record ..	51	
12	March 23, 1907 ...	July 9, 1907 ...	55	15
	April 17, 1908	September 19, 1908	62*	22

* This is calculated until next calving. The cow was never dry.

As in the case of the Gir cows, we may again say that there is nothing in these figures to indicate that the season of calving had any very material effect on the length of the lactation period. For eight out of the ten animals for which our records embrace more than one lactation period, the length of the milking period did not vary more than would be expected. With the other two the variation was very large. The average length of the lactation period in each cow is as follows :—

No. 2	...	...	...	...	51·5 weeks.
No. 3	...	...	...	...	33 weeks.
No.	...	...	...	...	80 weeks.*
No.	...	...	...	...	59·5 weeks.
No. 7	...	...	...	...	59 weeks.*
No. 8	...	...	...	...	53·5 weeks.
No. 9	...	...	...	...	50·5 weeks.
No. 10	...	...	...	...	48 weeks.
No. 11	...	...	...	...	52 weeks.
No. 12	...	...	...	...	58·5 weeks.

Omitting those cases, marked with an asterisk, where the period of lactation was not completed when the cow calved again, the average length of the lactation period for the remaining eight cows is 50·8 weeks, or about ten weeks longer than the average for the Gir cows.

There seems to be some indication in certain of these cases of the effect of the delaying of the service of the cow on the length of the lactation period. The results are not numerous enough to enable us to insist on the matter, but the indication is shown by the following figures :—

Cow No. 8	{	Served 7 weeks after calving	...	Lactation 43 weeks.
		Served 25 weeks after calving	...	Lactation 64 weeks.
Cow No. 9	{	Served 12 weeks after calving	...	Lactation 51 weeks.
		Served 26 weeks after calving	...	Lactation 58 weeks.
Cow No. 12	{	Served 15 weeks after calving	...	Lactation 55 weeks.
		Served 22 weeks after calving	...	Lactation more than 62 weeks

We may now turn to the yield at various stages of the milking period, and we shall give figures for each tenth of the milking period exactly as we have done in the case of the Gir cows. They embrace only one lactation period in each case.

* These averages are minima, as the cow was still in milk when it again calved.

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11	No. 12
Total number of weeks.	60	46	34	27	66	54	61	64	51	48	53	55
Number of weeks after calving that the animal was served.	25	22	10	9	33	No record	21	25	12	15		15
First tenth of milking period	lbs. 410½	lbs. 297½	lbs. 232	lbs. 145½	lbs. 499	lbs. 480½	lbs. 712½	lbs. 620½	lbs. 271½	lbs. 171½	lbs. 332	lbs. 409½
Second	412½	343½	261½	157½	562½	541½	614½	562½	600½	233½	397½	582½
Third	379½	332½	205½	173½	559	602	667½	555	628½	270½	498	580½
Fourth	365	316	206½	160½	572½	549	661½	539½	631½	275½	446½	469½
Fifth	300½	281½	175½	140½	512	511	555½	512½	607½	242½	435½	381½
Sixth	312½	228½	147½	121	438	446½	427	428½	522	233	362½	334½
Seventh	325½	216	107	101½	347	393	324	336½	519½	230½	371½	293½
Eighth	300½	204½	88	83½	319½	320	229½	297½	485	197½	329½	228½
Ninth	208½	166½	64½	63½	236½	253½	203	249½	382½	173	276½	181½
Tenth	99½	135	45½	37	127½	175½	110½	127½	256½	172½	169½	201½
TOTAL YIELD	3,114	2,529½	1,533½	1,184½	4,173½	4,272½	4,493½	4,250½	4,905½	2,220½	3,605	3,663½

These figures indicate that in two cases the first tenth of the lactation period yielded the largest amount of milk, in four cases the second tenth, in three cases the third tenth, and in three cases the fourth tenth. After this point the yield uniformly diminished for the remainder of the lactation, except in the case of Cow No. 7. Here where the actual maximum is in the first tenth, a second rise occurs in the third tenth of the total milking period.

The general average for the whole of the twelve cows is as follows :—

First tenth of the milking period	...	415½
Second do. do.	...	440¾
Third do. do.	...	454
Fourth do. do.	...	434¼
Fifth do. do.	...	388
Sixth do. do.	...	333½
Seventh do. do.	...	299
Eighth do. do.	...	257
Ninth do. do.	...	205
Tenth do. do.	...	137½

Turning to the relation of the composition of the milk to the period of the lactation, we may again divide the milking period into tenths, and then we obtain the following figures :—

TABLE FAT PERCENTAGE IN MILK.
(See next page.)

FAT PERCENTAGE IN MILK.

	1		2		3		4		5		6		7		8		9		10		11		12	
	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.
First tenth of milking period																								
Second do.															5.8	5.5	5.1*	5.8*						
Third do.	5.7*	5.7*													4.6*	5.4*	4.8	5.1						
Fourth do.	5.9	6.2	5.3	6.2																				
Fifth do.	6.4*	6.4*	6.1	7.0											5.9	5.8	4.4*	4.4*						
Sixth do.	5.6*	6.7	6.4*	6.8*											6.0	6.2	4.9*	5.0						
Seventh do.	5.7	5.9	6.1	7.1	6.0*	4.6*									6.2	6.9	5.0	4.8			4.5	5.0	5.2*	5.1
Eighth do.	6.3	6.5	5.8	6.4	6.1	6.4	5.5*	5.2	5.5*	5.8*	6.1	6.1	4.4*	5.3	5.9*	6.1*	6.0	5.8	6.8	7.5	4.9	5.5	5.3	5.4
Ninth do.	6.3	6.6	6.6	6.6	5.9	6.1	5.4	5.2	5.8*	6.7*	6.7	7.3	5.2	4.8	6.2*	5.8*	5.8	6.1	7.3*	7.0	5.8	6.3	5.8	6.1
Tenth do.	6.6	6.5	7.0	7.2	6.8	5.9	4.5*	5.4*	6.6	6.7	6.8	7.7	5.6*	5.6			5.6	5.6	6.0	7.7	5.8	6.6	6.1	6.6

At first sight these results appear almost wholly irregular, but when critically examined there is found to be a tendency in practically every case to a distinct and fairly regular rise in the fat value of the milk as the lactation progresses. This appears to be independent of the period of the year when the lactation commences, and also very largely of the yield of milk which the cow is actually giving at the time. Taking only those cows (Nos. 1, 2, 8, 9, 11 & 12), for which we have a sufficient number of determinations, and eliminating casual variations by the usual statistical method of averaging together the figures for three successive tenths of the milking period, we have as follows:—

	1		2		8		9		11		12	
	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.	M.	E.
	%		%		%		%		%		%	
1st tenth to 3rd tenth			...		5.4	5.6	4.8	5.1				...
2nd tenth to 4th tenth					5.5	5.8	4.7	4.8				...
3rd tenth to 5th tenth	6.0	6.1	...	...	6.0	6.0	4.8	4.7			...	
4th tenth to 6th tenth	6.0	6.4	5.9	6.7	6.1	6.5	5.1	5.0	4.7	5.2		
5th tenth to 7th tenth	5.9	6.3	6.2	7.0	6.1	6.4	5.5	5.3	4.7	5.3	4.9	5.2
6th tenth to 8th tenth	5.9	6.4	6.1	6.6	6.1	6.2	5.8	5.6	5.2	5.5	5.2	5.6
7th tenth to 9th tenth	6.1	6.3	6.2	6.7	6.2	6.0	5.8	5.9	5.6	5.7	5.7	5.9
8th tenth to 10th tenth	6.4	6.5	6.5	6.7			5.7	5.9	5.9	6.1	6.0	6.3

In every case the tendency to increase in fat content in the milk as the lactation progresses is clear. It seems more obvious in the case of the morning milk than with the evening milk,—and usually becomes very marked (as would be expected) in the last stage of the lactation. It is a far more constant phenomenon than with the Gir cows previously considered, where the results with regard to this point were very irregular.

V.

The Relationship of the Yield and Composition of the Milk of Cows to the Weather Conditions.

The relationship of the yield and composition of the milk yielded by Indian cows to the weather conditions seems from a consideration of our figures to be very small, provided (as is the case at the Poona dairy) the green food given does not seriously depend on the state of the weather. We have already indicated how the figures for composition vary in the Poona herd from month to month, and have drawn such conclusions as seem justified. These are :—

1. That the milk of Gir and Sind cows of which the Poona dairy chiefly consists is remarkably constant in composition during the various seasons.
2. That the richest milk, taking the whole herd into consideration is reached in the latter part of the rains.
3. That the *difference* in composition between the morning and evening milks is less in the rainy season than during the remainder of the year.

A critical examination of the detailed figures fails to add anything to these conclusions. It may be interesting, however, to set out the average maximum and minimum temperature, the average humidity of the atmosphere at 8 A.M., and the total rainfall for each week during the period when the observations were being made, and this is shown in an appendix.

VII.

The variation which may be expected to occur in the Milk of Healthy Animals of One Breed.

One of the most astonishing results of the present investigation has been to show how widely the milk from individual animals of one breed varies. This variation is shown in the following table :—

GIR COWS.

No.	Number of weeks.	MORNING MILK.				EVENING MILK.			
		Max. fat.	Min. fat.	Mean fat.	Mode of fat.	Max. fat.	Min. fat.	Mean fat.	Mode of fat.
		%	%	%	%	%	%	%	%
1	14	6·7	3·7	5·3	5·5-6·0	7·5	5·5	6·5	6·5-7·0
2	4	5·9	4·9	5·4	5·0-5·4			...	.....
	11	..	..	..		9·0	4·8	6·7	7·0-7·5
3	11	5·4	3·4	4·3	4·0-4·5			...	...
	9		..	..	...	5·2	4·1	4·8	4·5-5·0
4	27	6·9	3·4	5·3	5·0-5·5	7·5	4·0	6·1	6·0-6·5
5	31	6·8	4·2	5·4	4·5-5·0	..		..	..
				..	5·5-6·0	..		...	...
6	32		..	...		8·2	4·0	6·0	5·5-6·0
	14	6·6	4·8	5·4	5·0-5·5	...	..	..	.....
6	16	...			...	7·7	4·2	6·3	5·5-6·0
					.....			...	6·0-6·5
7	39	7·3	4·6	5·9	5·5-6·0	7·8	4·5	6·4	5·5-6·0
8	35	7·4	3·6	5·9	6·0-6·5	...	...		..
	36		...	..	.....	7·2	3·1	6·1	6·5-7·0

The variations thus shown are very much larger than would be expected in a well-selected herd of European cows. It might perhaps at first sight be attributed to change of food, but we cannot find any reason to suppose that this is more than one of several factors in the matter. The maxima and minima for each cow do not occur in any particular time of the year when the food might be expected to be drier or less succulent than at other times. Thus the maximum fat content of the milk occurs as follows :—

Gir cows, excluding the last few weeks of the lactation.

			Morning.	Evening.
No. 1	...	...	December	October
No. 4	...	...	December	January

Gir cows, excluding the last few weeks of the lactation.—contd.

	Morning.	Evening.
No. 5	March	December*
No. 6	December	December
No. 7	April	April
No. 8	May	June

All that can be said in this case is that there is a tendency for the milk to be richer in the dry season, but this dry season ranges from October when there is still plenty of succulent grass to June, just before the break of the rains. It must be remembered, however, that owing to its position, with ample irrigation, there is always a supply of fresh green food on the Poona Dairy Farm, though naturally it is more limited in the months from January to June.

In any case, while in an individual cow there may be a tendency to concentration of the milk during the drier season, it may be said that it does not generally tend to a maximum at any particular period.

This, however, does not answer the question of the extreme differences between different cows. And one can only, in the end, attribute this to the absolute lack of selection in the production of milk or other stock in India. A certain amount of selection has been practised on the Poona Dairy Farm for the past few years, but it has not been rigid enough apparently to bring either the yield or composition of the milk to anything like a common standard. While it is essential to have a satisfactory environment for the production of high yield of milk and milk of good quality from all cows,—yet this is of little use if rigid regular selection is not practised. This appears to be true of Indian as of other cows,—and the proof of this seems to be one of the very clear results of our figures.

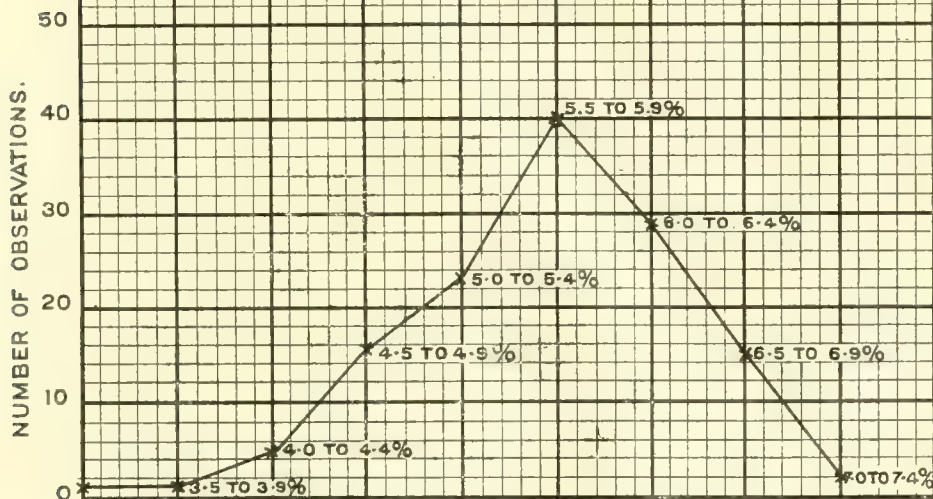
Similar conclusions may be reached with regard to the Sind cows, where, however, the breed has been kept in the dairy for a longer period. The variation is shown as in the previous case in the table which follows.

* We have excluded in this case one very widely differing analysis.

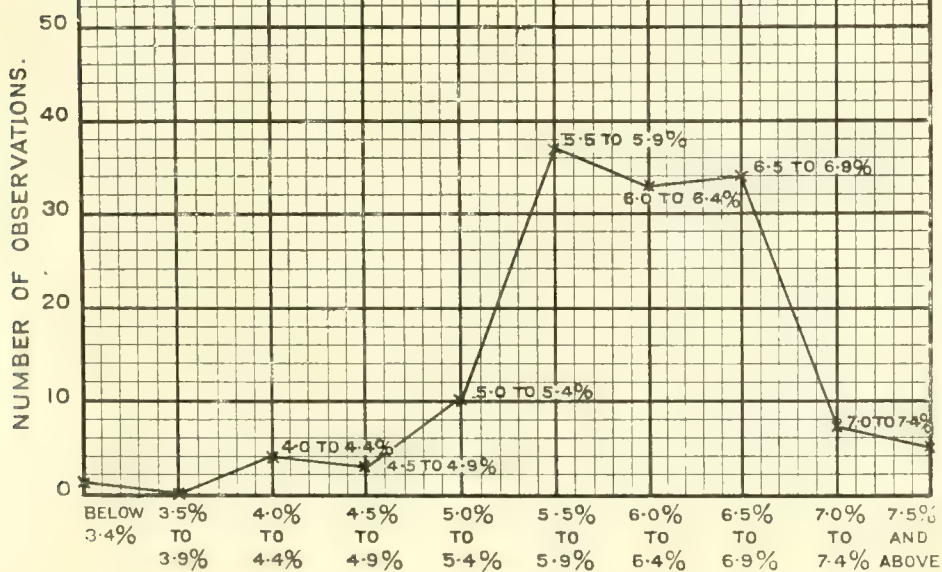
VARIATIONS IN FAT CONTENT OF MILK.

GIR. COWS

(1) MORNING MILK. (TOTAL NUMBER OF OBSERVATIONS-132)



(2) EVENING MILK. (TOTAL NUMBER OF OBSERVATIONS 134)



PERCENTAGE OF FAT IN MILK.

SIND COWS.

No.	Number of weeks.	MORNING MILK.				EVENING MILK.			
		Max. fat.	Min. fat.	Mean fat.	Mode of fat.	Max. fat.	Min. fat.	Mean fat.	Mode of fat.
		%	%	%	%	%	%	%	%
1	43	6.8	3.9	6.0	6.1-6.5	7.2	4.2	6.3	6.1-6.5
2	32	7.8	4.8	6.1	5.6-6.0	7.7	5.2	6.7	7.6-8.0
3	35	7.4	5.2	6.2	6.1-6.5	7.4	3.9	6.3	6.1-6.5
4	7	6.5	4.5	5.4	5.6-6.0	6.3	4.6	5.5	5.1-5.5
	8								5.6-6.0
5	45	7.5	4.6	6.0	5.6-6.0				
					6.0-6.5				
6	49					7.8	4.7	6.7	6.6-7.0
	50	7.9	4.6	6.0	5.6-6.0	8.8	4.9	6.5	6.1-6.5
7	52								
	54	7.8	3.7	5.5	6.1-6.5	7.7	3.2	5.6	5.6-6.0
8	52								
	53	7.8	3.4	6.0	6.6-7.0	7.5	4.3	6.1	5.6-6.0
9	51								
	46	6.6	3.6	5.3	5.1-5.5	7.2	4.0	5.4	5.6-6.0
10	46								
	25	7.6	4.4	6.5	6.6-7.0				
					7.1-7.5				
11	26					8.7	5.1	7.3	7.1-7.5
	36	8.3	4.2	5.3	4.1-4.5	8.3	4.0	5.3	5.1-5.5
12	36								
	57	7.3	2.9	5.7	5.1-5.5	8.4	4.1	6.3	6.6-7.0
	57								

The variation is here again immense in individual cows at different times. The periods at which the milk is richest are shown in the following table:—

	Morning.	Evening.
No. 1	April	April
No. 2	March	April
No. 3	May	April
No. 5	May	October
No. 6	January	January
No. 7	September	September
No. 8	March	May
No. 9	June	June
No. 10	February	February
No. 11	April*	April
No. 12	April	October

The same remarks apply here exactly as have already been made in connection with the Gir cows. The herd of Sind cows, as already remarked, has been longer kept at the Poona dairy, and

Excluding one exceptional analysis in March.

hence there is on the whole a greater uniformity than with the other breed. But it is still exceedingly variable, and from the figures we present, an estimate may be made as to the extreme character of the variability of the yield and quality of the milk of cows under conditions where practically no selection exists.

VIII.

Summary of Conclusions.

The data which we present in this paper are evidently only the beginning of a study of the milk of Indian cows, but such as they are they seem to indicate that in the two breeds studied the following conclusions may legitimately be drawn:—

1. In a mixed herd of cows of these two breeds, the composition of the milk may be considered to be fairly constant. The morning milk will contain between four and five per cent. of fat, and the evening milk between five and six per cent. of fat. Under the conditions of the Poona dairy farm, where green fodder is grown and fed throughout the year, there will not usually be a very marked drop during the rains. The richest milk, taking the whole herd into consideration, is reached in the latter part of the rains.

2. The evening milk is nearly always richer than the morning milk. This difference is, however, less marked in the rainy season than during the remainder of the year.

3. Of the two breeds studied, the 'Gir' gives milk of decidedly poorer fat content than the 'Sind,' the average figures being:—

	Morning milk.	Evening milk.
'Gir' cows	... 5.2 per cent.	... 6.2 per cent.
'Sind' cows	... 6.0 per cent.	... 6.3 per cent.

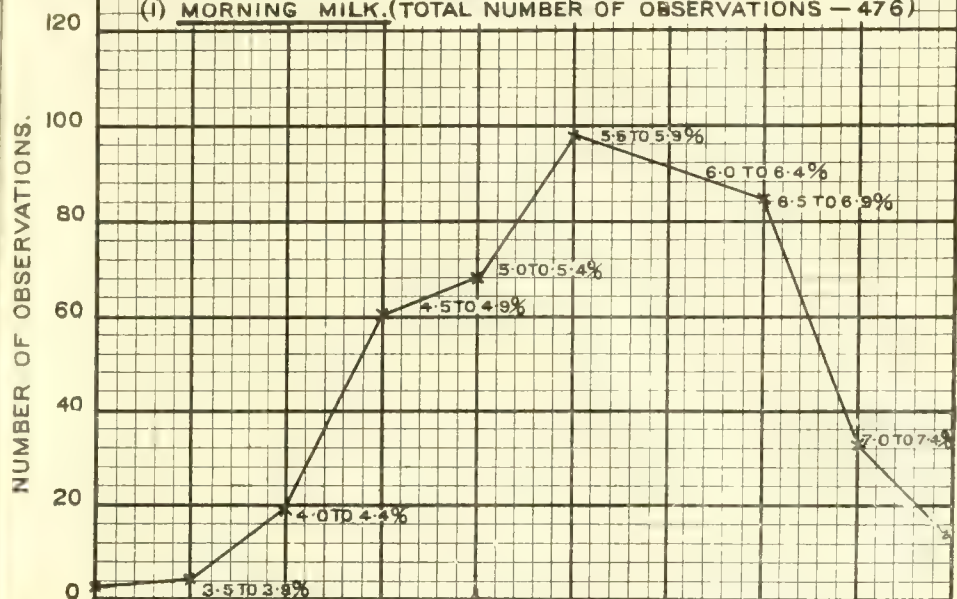
Thus there is a difference of nearly one per cent. in the fat content of the morning milk of these two breeds of cows. There is little difference in the composition of the evening milk.

4. There seems little relationship between the composition of the milk of individual cows and the yield, except that the milk becomes slightly richer at the end of the period of lactation. Apart from this, the milk yielded by a cow is wonderfully constant in composition whatever the amount of yield it is giving.

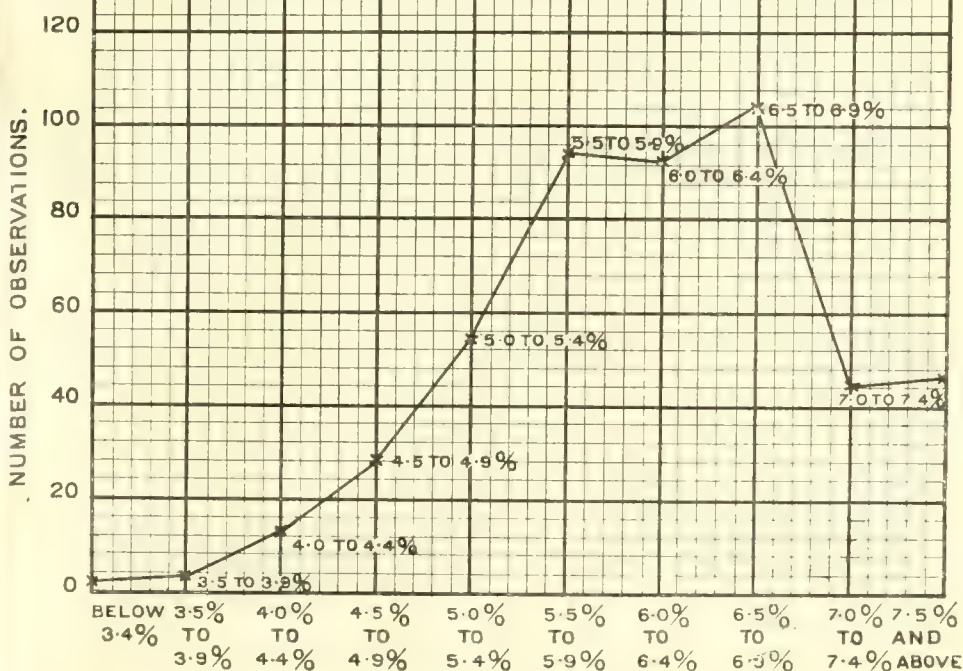
VARIATIONS IN FAT CONTENT OF MILK.

SIND COWS.

(1) MORNING MILK. (TOTAL NUMBER OF OBSERVATIONS - 476)



(2) EVENING MILK. (TOTAL NUMBER OF OBSERVATIONS - 480)



BELOW 3.4% TO 3.9% 4.0% TO 4.4% 4.5% TO 4.9% 5.0% TO 5.4% 5.5% TO 5.9% 6.0% TO 6.4% 6.5% TO 6.9% 7.0% TO 7.4% 7.5% AND ABOVE



5. On the other hand, there is a very great variation in the composition of the milk of the animals of one breed. This is what would be expected in breeds of cows which have undergone no selection for many generations.

6. The average lengths of lactation for Gir cows is 40·5 weeks, and for Sind cows is 50·8 weeks, but this varies very much, as would again be expected for unselected cows.

7. The yield of milk from a cow rises to its maximum almost at once, and remains almost constant for about the first two-fifths of the lactation period. After this there is a regular and steady decline to the end of the lactation.

8. Among Sind cows there is a tendency for the milk to become richer in fat as the lactation progresses. It seems more obvious in the case of the morning milk than with the evening milk, and usually becomes very marked in the last stage of the lactation. Among Gir cows the rise is not nearly so constantly found. Our figures, in fact, do not seem to indicate any constant relationship between the composition and the period of lactation of the Gir cows.

9. One of the most marked results of the whole investigation is to emphasize the extremely unselected character of herds of even recognised milking breeds like the 'Gir' and 'Sind' in India. The dominance of the individuality of the cows almost renders the environmental influences on the composition of the milk yielded incapable of being detected.

APPENDIX I.

YIELD AND COMPOSITION OF MILK OF COWS.

GIR COW—No. 1. (KAGALL.)

Date of calving—May 7th, 1907

In milk until January 13th, 1908.

DATES.		ANALYSIS OF MILK.					
		Yield of milk for the week.	MORNING MILK.		EVENING MILK.		
			Fat	Total solids.	Fat.	Total solids.	
1907.		lbs. ozs.	Per cent	Per cent.	Per cent.	Per cent.	
September	20		8.4	13.8	5.5	14.7	
Do.	20—26	45 0	5.9	15.1	6.8	16.0	
Do.	27—3 October	41 0	4.6	14.0	5.8	15.1	
October	4—10	38 0	3.7	13.7	4.6	14.0	
Do.	11—17	36 12	5.9	15.7	5.7	15.0	
Do.	18—24	32 12	4.9	14.3	7.3	16.2	
Do.	25—31 ..	33 8	5.8	15.7	7.5	17.1	
November	1—7	30 8	5.6	15.6	7.2	16.9	
Do.	8—14 ...	32 4	5.2	15.0	6.7	16.3	
Do.	15—21	27 0	4.8	13.8	7.0	16.2	
Do.	22—28	21 0	6.1	15.8	6.7	16.0	
Do.	29—5 December	20 12	6.7	16.7	7.0	16.8	
December	6—12	19 8	5.7	15.0	6.5	16.3	
Do.	13—19	21 4	5.4	14.6	6.9	16.2	
Do.	20—26	18 4	...		...
1908.							
December	27—2 January ...	14 12					
January	3—9	14 8			7.7	17.3	
Do.	10—13	3 12					

GIR COW—No. 2. (NABADI.)

Date of calving May 4th, 1907.

In milk until December 4th, 1907.

DATES.		Yield of milk for the week.		ANALYSIS OF MILK.			
				MORNING MILK.		EVENING MILK.	
				Fat.	Total solids.	Fat.	Total solids.
1907.		lbs.	ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	20	...	...	5.3	13.9	8.3	16.8
Do.	20-26	35	8	5.4	13.9	7.1	15.2
Do.	27-3	34	0	4.9	12.4	9.0	16.3
October	4-10	15	4	5.9	14.3	5.8	14.7
Do.	11-17	17	12	...	...	4.8	13.2
Do.	18-24	16	4	...	...	6.9	15.3
Do.	25-31	12	12	...	...	7.1	15.5
November	1-7	11	8	...	...	6.3	14.6
Do.	8-14	12	0	...	...	5.5	13.9
Do.	15-21	8	4	...	...	5.4	13.5
Do.	22-28	8	0	...	...	7.2	15.6
Do.	29-4	2	12	...	...	...	...

GIR COW No. 3. (MUKARAN.)

Date of calving.—February 26th, 1907.

In milk until December 22nd, 1907.

DATES.		Yield of milk for the week.		ANALYSIS OF MILK.			
				MORNING MILK.		EVENING MILK.	
				Fat.	Total solids.	Fat.	Total solids.
1907.		lbs.	ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	20	...	...	4.2	11.8	4.9	12.5
Do.	20-26	26	8	4.3	12.0	4.9	12.7
Do.	27-3	24	4	3.9	11.7	4.7	12.7
October	4-10	19	4	3.4	11.3	4.1	12.0
Do.	11-17	21	8	3.9	11.5	5.2	13.3
Do.	18-24	18	8	4.8	12.8	4.7	12.9
Do.	25-31	17	4	4.5	12.8	4.9	13.4
November	1-7	14	0	3.9	12.1	5.0	13.1
Do.	8-14	15	8	4.6	13.2	4.8	12.7
Do.	15-21	11	0	5.4	13.7	...	...
Do.	22-28	9	8	4.4	12.3	...	...
Do.	29-2	4	8	...	...	...	...

GIR COW—No. 4. (UMBARI.)

Date of calving—June 22nd, 1907.

In milk until April 7th, 1908.

DATES.		Yield of milk for the week.	ANALYSIS OF MILK.			
			MORNING MILK.		EVENING MILK.	
			Fat.	Total solids.	Fat.	Total solids.
1907.		lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	20	...	4.3	13.4	4.1	12.9
Do.	20—26	73 12	4.4	13.5	5.8	15.3
Do.	27—3 October	82 0	4.7	13.9	5.6	14.1
October	4—10	88 4	3.4	13.1	4.0	13.2
Do.	11—17	82 8	5.2	14.6	6.1	15.0
Do.	18—24	86 8	4.7	13.7	5.9	14.8
Do.	25—31	85 12	4.9	14.3	6.1	15.7
November	1—7	78 12	5.3	14.7	6.6	15.2
Do.	8—14	75 0	5.9	14.8	5.2	13.5
Do.	15—21	74 4	4.9	13.6	6.2	14.7
Do.	22—28	73 8	5.4	14.6	6.4	15.1
Do.	29—5 December	72 4	5.7	14.9	7.2	16.5
December	6—12	71 0	6.9	16.0	6.6	15.4
Do.	13—19	63 8	5.2	13.8	5.4	13.7
Do.	20—26	63 12	...	...	...	...
1908.						
December	27—2 January	61 8	...	...	...	...
January	3—9	67 0	5.5	14.4	7.2	16.0
Do.	10—16	67 8	5.4	14.1	7.2	16.5
Do.	17—23	68 12	5.2	14.1	7.5	16.4
Do.	24—30	64 4	6.3	15.9	5.8	14.7
Do.	31—6 February	57 4	6.2	15.6	6.6	15.3
February	7—13	67 0	6.1	15.2	7.1	16.2
Do.	14—20	59 0	5.6	14.6	5.8	14.6
Do.	21—27	57 0	5.9	15.2	4.6	13.8
Do.	28—5 March	26 12	4.2	12.6	6.6	14.7
March	6—12	23 0	5.9	14.6	6.3	15.2
Do.	13—19	18 0	6.0	15.2	6.5	15.6
Do.	20—26	13 0	5.3	14.4	5.4	14.0
Do.	27—2 April	6 4	6.2	15.5	6.5	16.1
April,	3—7	4 4	...	...	...	...

GIR Cow—No. 5. (PAVALI.)

Date of calving—February 25th, 1907.

In milk until May 3rd, 1908.

DATES.		Yield of milk for the week.		ANALYSIS OF MILK.			
				MORNING MILK.		EVENING MILK.	
				Fat.	Total solids	Fat.	Total solids.
1907.		lbs.	ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	20	...	...	5.2	14.5	6.2	14.9
Do.	20-26	71	0	4.7	13.9	4.0	12.4
Do.	27-3 October	69	8	4.2	12.9	5.3	13.8
October	4-10	64	4	4.7	14.1	5.5	14.3
Do.	11-17	65	8	5.1	14.7	5.9	15.1
Do.	18-24	64	4	4.9	13.9	5.5	14.5
Do.	25-31	68	0	4.4	13.8	5.7	14.7
November	1-7	62	12	4.8	14.3	6.4	15.6
Do.	8-14	65	4	4.8	14.0	8.25	17.7
Do.	15-21	61	4	5.4	14.6	5.3	14.4
Do.	22-28	57	12	5.3	14.5	5.9	14.5
Do.	29-5 December	57	0	6.0	15.3	6.9	15.8
December	6-12	50	8	5.2	14.3	6.4	15.1
Do.	13-19	50	8	5.8	14.7	6.7	15.4
Do.	20-26	50	12	not analysed		not analysed.	
1908.							
December	27-2 January	45	8	not analysed		not analysed	
January	3-9	52	12	5.9	14.7	6.2	14.9
Do.	10-16	48	12	5.7	14.7	5.9	14.8
Do.	17-23	47	4	4.5	13.9	6.1	15.2
Do.	24-30	49	0	5.3	14.9	6.1	15.2
Do.	31-6 February	39	4	5.9	15.6	6.0	15.0
February	7-13	45	4	5.0	14.0	6.3	14.8
Do.	14-20	40	4	4.9	13.8	5.4	14.1
Do.	21-27	39	0	5.6	14.4	5.4	14.2
Do.	28-5 March	40	4	4.6	13.7	5.3	14.5
March	6-12	34	4	6.4	15.4	5.6	14.6
Do.	13-19	33	8	5.7	14.4	6.0	15.2
Do.	20-26	40	8	5.4	14.0	6.3	15.6
Do.	27-2 April	28	12	4.5	13.26	5.7	14.4
April	3-9	27	4	5.6	14.5	5.8	15.1
Do.	10-16	28	12	6.8	15.9	5.9	16.3
Do.	17-23	17	8	not analysed		7.0	16.3
Do.	24-30	7	12	6.4	15.1	6.7	16.3
May	1-7	2	0	6.3	15.6	6.5	16.2

GIR COW—No. 6. (GOBL.)

Date of calving—January 27th, 1907.

In milk until January 23rd, 1908.

DATES.		Yield of milk for the week.		ANALYSIS OF MILK.			
				MORNING MILK.		EVENING MILK.	
				Fat.	Total solids.	Fat.	Total solids.
1907.		lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
September	20		5.4	14.6	4.2	13.2	
Do.	20—26	66 0	4.8	14.0	6.3	15.6	
Do.	27—3 October	61 12	4.9	13.8	6.5	15.4	
October	4—10	54 12	5.4	14.5	4.9	13.8	
Do.	11—17	58 0	5.4	14.9	6.1	15.2	
Do.	18—24	62 12	5.4	14.4	5.7	14.6	
Do.	25—31	58 0	5.4	14.9	5.8	15.0	
November	1—7	55 12	4.9	14.5	6.3	15.5	
Do.	8—14	58 4	5.4	13.3	6.6	16.3	
Do.	15—21	47 12	6.6	15.4	5.6	15.0	
Do.	22—28	46 8	4.9	14.7	6.0	15.5	
Do.	29—5 December	43 4	5.5	15.4	7.1	16.9	
December	6—12	34 0	6.2	15.6	7.4	16.9	
Do.	13—19	34 8	5.7	15.1	6.6	16.3	
Do.	20—26	30 4					
1908.							
December	27—2 January	20 4					
January	3—9	14 8	...		7.7	17.3	
Do.	10—16	11 8			7.3	16.8	
Do.	17—23	5 12			...		

GIR COW—No. 7. (MAHALI.)

Dates of calving—June 13th, 1906 and March 19th, 1908.

In milk until November 6th, 1907, and again until after observations were terminated.

ANALYSIS OF MILK.

DATES.			Yield of milk for the week.		MORNING MILK.		EVENING MILK.	
					Fat.	Total solids.	Fat.	Total solids.
1907.			lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.	
September	20	...	26	0	5.3	14.9	6.2	15.1
Do.	20-26	...	23	4	5.9	14.9	6.5	15.4
Do.	27-3	October	22	0	5.8	15.0	5.9	14.9
October	4-10	...	20	4	6.2	15.9	6.8	15.7
Do.	11-17	...	18	8	6.8	16.3	7.5	16.3
Do.	18-24	...	15	4	6.1	15.2	6.6	15.8
Do.	25-31	...	9	0	6.5	16.4	7.1	16.3
November	1-6	...						
1908.								
March	20-26	...	61	0	4.6	13.4	5.5	14.4
Do.	27-2	April	71	8	5.5	14.9	7.8	14.9
April	3-9	...	55	4	6.0	15.6	6.1	15.6
Do.	10-16	...	25	0	7.3	16.3	7.6	16.5
Do.	17-23	...	31	0	6.3	15.3	6.6	15.2
Do.	24-30	...	50	12	5.9	15.0	6.2	15.4
May	1-7	...	55	8	5.7	14.7	5.8	14.7
Do.	8-14	...	66	8	6.0	16.0	6.4	15.5
Do.	15-21	...	66	4	5.6	15.0	5.9	15.5
Do.	22-28	...	76	8	5.9	15.3	6.2	15.8
Do.	29-4	June	70	12	5.4	14.5	5.6	14.6
June	5-11	...	82	12	6.6	15.7	6.5	14.9
Do.	12-18	...	75	12	5.8	15.2	5.9	15.0
Do.	19-25	...	66	8	6.1	15.7	6.3	15.5
Do.	26-2	July	65	4	5.8	14.2	5.7	15.2
July	3-9	...	70	4	5.7	14.9	5.8	15.3
Do.	10-16	...	75	4	6.3	15.7	6.5	15.6
Do.	17-23	...	63	8	5.7	14.6	5.9	15.1
Do.	24-30	...	67	0	6.2	15.6	6.5	15.6
Do.	31-6	August	69	8	6.5	15.8	6.7	16.0
August	7-13	...	50	0	5.3	14.0	5.8	14.9
Do.	14-20	...	65	4	...	...	...	...
Do.	20-27	...	69	8	...	...	...	...
Do.	28-3	September	66	4	...	...	...	...
September	4-10	...	66	12	5.6	14.4	5.9	14.2
Do.	11-17	...	60	4	5.4	14.1	5.7	13.9
Do.	18-24	...	45	4	6.6	14.5	5.9	14.5
Do.	25-1	October	58	0	6.6	14.5	5.8	14.2
October	2-8	...	63	4	6.1	14.8	5.4	14.2
Do.	9-15	...	55	12	5.4	14.6	6.4	15.6
Do.	16-22	...	52	12	5.6	14.7	4.5	13.2
Do.	23-30	...	53	12	6.5	15.9	6.7	15.4
Do.	30-5	November	50	4	6.2	15.5	6.4	15.6
November	6-12	...	48	8	...	...	...	...
Do.	13-19	...	37	8	5.7	14.6	5.9	14.6
Do.	20-26	...	42	8	6.7	15.4	6.8	15.6
Do.	27-3	December	44	8	...	...	...	...

GIR COW—No. 8. (BUDHI.)

Dates of calving—December 6, 1906 and March 10, 1908.

In milk until October 3, 1907, and again until January 10, 1909.

ANALYSIS OF MILK.

DATES.		Yield of milk for the week.		MORNING MILK.		EVENING MILK.	
				Fat.	Total solids.	Fat.	Total solids.
1907.		lbs.	ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	20	20	8	3.6	11.8	3.1	11.4
Do.	20-26	10	8	4.6	13.0	4.4	12.6
Do.	27-3			..		..	..
1908.							
March	10-12	23	0	..	..	4.9	14.4
Do.	13-19	76	0	7.4	18.2	6.8	16.5
Do.	20-26	57	4	5.6	15.0	6.0	14.7
Do.	27-2	75	12	5.3	15.1	6.1	15.4
April	3-9	96	4	5.9	16.1	6.7	14.1
Do.	10-16	107	0	6.2	15.5	6.1	15.3
Do.	17-23	130	0	6.2	15.9	5.9	15.5
Do.	24-30	134	0	5.7	15.5	5.9	15.7
May	1-7	129	4	5.8	15.3	6.1	15.9
Do.	8-14	126	8	5.8	14.6	6.0	15.1
Do.	15-21	142	12	6.0	16.0	5.7	14.0
Do.	22-28	140	8	6.5	16.6	6.6	17.2
Do.	29-4	137	4	6.7	16.7	6.7	16.1
June	5-11	134	0	6.1	15.3	7.2	16.8
Do.	12-18	137	4	6.5	16.0	6.7	16.5
Do.	19-25	126	0	6.7	16.0	6.9	15.4
Do.	26-2	126	4	6.4	14.8	6.5	15.8
July	3-9	120	0	5.9	15.3	6.6	16.7
Do.	10-16	119	0	6.25	15.8	6.7	16.0
Do.	17-23	119	8	6.4	15.6	6.8	16.50
Do.	24-30	116	12	6.2	15.6	6.5	15.6
Do.	31-6	94	8	5.8	15.1	6.0	15.5
August	7-13	81	8	6.5	15.70	6.9	16.2
Do.	14-20	93	12	..	..	..	..
Do.	21-27	93	0	..	..	..	..
Do.	28-3	96	4	..	..	..	..
September	4-10	88	12	5.8	15.0	6.4	15.4
Do.	11-17	83	4	6.5	16.2	6.5	16.0
Do.	18-24	90	0	6.5	16.2	6.8	16.1
Do.	25-1	77	12	5.4	14.7	6.2	15.21
October	2-8	79	4	5.5	14.8	6.3	15.3
Do.	9-15	78	4	5.8	15.2	5.7	15.0
Do.	16-22	75	8	5.6	14.3	5.3	14.3
Do.	23-29	72	0	6.4	15.6	6.9	16.2
Do.	30-5	55	0	5.4	15.0	5.8	15.3
November	6-12	54	0	..	..	..	..
Do.	13-19	50	12	6.0	14.8	6.3	15.0
Do.	20-26	43	12	4.8	12.8	5.6	14.8
Do.	27-3	44	0	..	..	..	..

SIND COW—No. 1. (BULAKHI.)

Date of calving—May 25th, 1907.

In milk until July 22nd, 1908.

		ANALYSIS OF MILK.							
DATES.		Yield of milk for the week.		MORNING MILK.		EVENING MILK.			
				Fat.	Total solids	Fat.	Total solids.		
1907.		lbs	ozs.	Per cent.	Per cent.	Per cent.	Per cent.		
September	20	..	..	4.8	14.6	4.2	14.0		
Do.	20-27	..	..	6.0	16.0	5.7	15.2		
Do.	27-3	October	..	6.2	15.1	5.7	15.2		
October	4-10	..	..	5.7	16.9	6.2	15.8		
Do.	11-17	..	..	6.6	16.5	6.0	15.8		
Do.	18-24	..	..	6.2	15.5	6.1	15.9		
Do.	25-31	..	..	6.3	15.6	6.5	16.9		
November	1-7	..	..	5.7	15.7	5.8	16.0		
Do.	8-14	..	..	5.6	16.4	6.4	17.0		
Do.	15-21	..	..	5.2	15.6	6.0	16.2		
Do.	22-28	..	..	4.9	17.1	5.7	15.1		
Do.	29-5	December	..	4.9	16.7	6.6	16.7		
December	6-12	..	..	4.7	16.2	6.9	17.2		
Do.	13-19	..	..	4.8	16.4	6.8	16.5		
Do.	20-26	..	..	4.9	12	..	..
Do.	27-2	January 1908	..	4.9	4	..	..
1908.									
January	3-9	..	..	4.8	8	5.9	16.0	6.5	16.7
Do.	10-16	..	..	5.6	4	4.7	13.5	6.8	17.0
Do.	17-23	..	..	5.7	12	5.8	15.9	7.2	17.6
Do.	24-30	..	..	5.2	0	5.8	15.8	6.6	16.6
Do.	31-6	February	..	4.6	12	5.6	15.3	6.2	15.3
February	7-13	..	..	5.2	12	6.2	16.4	6.1	15.6
Do.	14-20	..	..	5.1	8	5.3	15.6	6.5	17.0
Do.	21-27	..	..	5.3	4	3.9	13.7	4.6	14.8
Do.	28-5	March	..	5.5	4	5.2	15.0	5.6	15.6
March	6-12	..	..	5.9	4	6.4	16.6	6.7	17.0
Do.	13-19	..	..	5.9	0	6.6	16.6	6.2	16.3
Do.	20-26	..	..	5.7	4	4.6	13.5	5.5	15.0
Do.	27-2	April	..	4.7	8	6.5	16.4	6.2	15.6
April	3-9	..	..	4.9	0	6.8	16.8	6.5	15.6
Do.	10-16	..	..	4.9	12	6.7	15.9	6.8	16.0
Do.	17-23	..	..	4.6	12	6.4	16.2	6.9	17.4
Do.	24-30	..	..	4.2	8	6.8	16.7	7.2	16.8
May	1-7	..	..	4.1	12	6.2	15.9	6.4	16.3
Do.	8-14	..	..	3.6	4	6.2	15.1	6.7	16.5
Do.	15-21	..	..	3.4	12	5.4	14.9	6.3	15.3
Do.	22-28	..	..	3.2	0	6.5	16.6	6.6	17.2
Do.	29-4	June	..	2.9	0	6.7	16.7	6.7	16.1
June	5-11	..	..	2.9	12	6.8	16.3	7.2	16.8
Do.	12-18	..	..	2.2	4	6.6	15.3	6.5	16.1
Do.	19-25	..	..	2.2	4	6.4	16.1	6.0	15.3
Do.	26-2	July	..	1.7	8	6.6	15.3	6.8	15.9
July	3-9	..	..	1.2	12	6.6	15.7	6.5	16.1
Do.	10-16	..	..	..	8	6.8	15.9	6.9	15.1
Do.	17-23	..	..	..	5	6.5	16.1	6.5	15.6

SIND COW—No. 2. (SUKHL.)

Date of calving—June 20th, 1907.

In milk until May 7th, 1908

				ANALYSIS OF MILK.					
DATES.				Yield of milk for the week		MORNING MILK.		EVENING MILK.	
						Fat.	Total solids.	Fat.	Total solids.
1907.				lbs.	ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	20	...	...	71	8	5.1	14.54	5.2	14.4
Do.	20-26			71	8	5.4	14.87	5.7	15.0
Do.	27-3	October		69	0	5.2	14.3	6.8	15.4
October	4-10			68	8	4.8	15.5	5.3	14.75
Do.	11-17			68	12	5.3	15.2	6.1	15.6
Do.	18-24			69	4	5.7	15.3	6.9	17.3
Do.	25-31			66	12	5.7	15.7	6.8	16.5
November	1-7			62	0	6.4	16.2	7.2	16.5
Do.	8-14			59	4	6.6	15.7	7.6	16.9
Do.	15-21			61	4	6.9	16.7	7.1	16.3
Do.	22-28			57	4	4.8	14.5	6.2	15.3
Do.	29-5	December		49	4	5.8	15.6	6.4	15.8
December	6-12			47	8	6.2	15.8	7.3	16.9
Do.	13-19			50	4	7.1	17.1	6.9	16.4
Do.	20-26			50	8	"	"	"	"
Do.	27-2	January 1908		49	0	"	"	"	"
1908.									
January	3-9			44	8	6.6	16.1	7.6	16.8
Do.	10-16			47	4	5.9	15.6	7.7	17.2
Do.	17-23			46	12	6.3	16.2	7.6	17.3
Do.	24-30			48	0	5.8	15.8	5.7	15.5
Do.	31-6	February		47	12	5.8	15.5	5.8	15.6
February	7-13			45	4	6.5	16.4	7.5	16.9
Do.	14-20			43	12	5.2	14.7	6.1	15.95
Do.	21-27			45	0	5.8	15.5	6.2	15.8
Do.	28-5	March		40	0	5.6	15.3	6.7	16.3
March	6-12			39	8	7.8	18.2	6.1	15.8
Do.	13-19			37	4	7.5	17.4	6.6	16.1
Do.	20-26			35	0	5.0	14.02	5.9	14.85
Do.	27-2	April		31	0	7.1	17.0	7.5	16.9
April	3-9			30	12	6.8	16.8	7.6	17.3
Do.	10-16			32	0	7.4	17.1	7.7	17.0
Do.	17-23			30	8	7.5	17.8	7.2	16.8
Do.	24-30			30	8	7.3	17.5	7.6	17.0
May	1-7			23	8	6.0	16.0	5.9	16.0

SIND COW—No. 3. (KANAYA.)

Dates of calving—April 19th, 1907 and March 9th, 1908.

In milk until December 18th, 1907 and again until November 18th, 1908.

ANALYSIS OF MILK.

DATES.		Yield of milk for the week.	MORNING MILK.		EVENING MILK.	
			Fat.	Total solids.	Fat.	Total solids.
1907.		lbs. ozs.	Percent.	Per cent.	Per cent.	Per cent.
September	20	.. ..	5.5	14.4	5.9	14.9
Do.	20-27	28 12	5.8	15.0	3.9	12.7
Do.	28-3	28 12	6.2	15.3	5.4	13.5
October	4-10	27 0	6.1	15.7	6.1	15.1
Do.	11-17	24 12	6.3	15.5	7.1	15.9
Do.	18-24	26 0	5.9	14.85	6.0	15.1
Do.	25-31	22 4	5.3	14.8	6.0	15.7
November	1-7	18 12	6.3	15.8	6.9	14.4
Do.	8-14	18 0	6.2	15.7	5.4	14.5
Do.	14-21	16 8	6.4	15.4	6.8	15.8
Do.	22-28	15 8	6.7	15.8	7.0	15.8
Do.	29-5	14 0	7.4	17.27	4.9	14.8
December	5-12	9 12	..	..	..	..
1908.						
April	10-16	74 8	6.0	15.2	6.1	15.3
Do.	17-23	61 4	6.4	15.8	6.8	16.5
Do.	24-30	55 4	..	..	7.4	16.3
May	1-7	53 4	6.5	16.2	6.8	16.4
Do.	8-14	58 8	6.3	14.7	6.5	16.2
Do.	15-21	52 4	7.0	16.9	6.5	16.6
Do.	22-28	49 0	6.2	15.9	6.0	15.5
Do.	29-4	45 8	6.4	15.2	6.2	15.2
June	5-11	41 0	5.4	13.5	6.9	16.7
Do.	12-18	35 12	6.4	15.8	6.3	16.0
Do.	19-25	35 0	6.6	16.6	6.4	15.8
Do.	26-2	36 0	5.8	15.0	6.2	15.6
July	3-9	30 8	7.0	16.3	6.5	16.2
Do.	10-16	28 4	5.7	14.4	6.4	16.2
Do.	17-23	23 0	5.8	15.0	6.2	15.7
Do.	23-30	19 0	6.5	15.1	6.3	15.2
Do.	31-6	19 8	5.9	14.9	6.5	15.6
August	7-13	19 8	6.7	16.0	6.7	16.4
Do.	14-20	18 0	..	..	..	..
Do.	21-27	18 0	..	..	..	..
Do.	28-3	18 12	..	..	..	..
September	4-10	16 4	6.8	16.3	6.8	16.5
Do.	11-17	15 12	6.3	15.3	6.8	15.8
Do.	18-24	13 4	6.3	16.3	6.6	15.7
Do.	25-1	14 4	..	..	..	..
October	2-8	13 4	5.2	14.5	5.4	13.9
Do.	9-15	11 8	5.6	14.5	5.8	14.0
Do.	16-22	12 0	5.8	14.5	6.1	15.2
Do.	23-29	12 0	..	..	..	..
Do.	30-5	10 0	..	..	..	..
November	6-12	10 4	..	..	..	..
Do.	13-19	5 4	..	..	..	..

SIND COW—No. 4. (PUTALI.)

Date of calving—May 6th, 1907.

In milk until November 11th, 1907.

DATES.		Yield of milk for the week.	ANALYSIS OF MILK.			
			MORNING MILK.		EVENING MILK.	
			Fat	Total solids.	Fat.	Total solids.
1907.		lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	20	...	6.5	15.3	5.5	14.2
Do.	20—26	...	5.7	14.9	5.7	14.9
Do.	27—3	October	5.0	13.9	6.3	15.0
October	4—10	...	4.6	13.9	5.3	14.0
Do.	11—17	...	5.8	14.9	4.6	13.2
Do.	18—24	...	5.8	14.7	5.7	14.7
Do.	25—31	...	4.5	13.4	5.8	15.7
November	1—7	...	...	...	5.1	13.1
Do.	8—14	...	...	...	...	...

SIND COW—No. 5. (HANSML.)

Date of calving—May 6th, 1908.

In milk until the end of the experiment.

DATES.		Yield of milk for the week.	ANALYSIS OF MILK.			
			MORNING MILK.		EVENING MILK.	
			Fat.	Total solids.	Fat.	Total solids.
1907.		lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	20	...	4.6	14.1	4.8	14.1
Do.	20—26	...	5.2	14.9	4.7	14.4
Do.	27—3	October	5.9	15.8	6.8	16.1
October	4—10	...	5.4	15.3	5.9	15.2
Do.	11—17	...	5.5	15.6	6.8	16.0
Do.	18—24	...	5.8	15.3	6.9	16.2
Do.	25—31	...	5.6	15.2	6.9	17.3
November	1—7	...	5.9	15.8	7.2	16.6
Do.	8—14	...	5.3	15.0	5.9	15.8
Do.	15—21	...	7.1	17.0	7.6	16.8
Do.	22—28	...	6.0	16.1	6.5	15.6
Do.	29—5	December	5.7	14.5	7.6	17.6
December	6—12	...	6.5	16.2	7.4	17.4
Do.	13—19	...	5.8	15.0	5.9	15.1
Do.	20—26	...	...	...	...	...

SIND COW—No. 5 (HANSMI)—*contd.*

Date of calving, May 6th, 1908.

In milk until the end of the experiment.

DATE.				Yield of milk for the week.	ANALYSIS OF MILK.			
					MORNING MILK.		EVENING MILK.	
					Fat.	Total solids.	Fat.	Total solids.
1908.				lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.
December	27-2	January	...	33 8	...	...	...	...
January	3-9	...	...	35 0	5.9	15.3	6.7	16.9
Do.	10-16	...	...	32 0	4.9	13.9	5.9	14.8
Do.	17-23	...	...	31 12	6.9	16.6	6.2	15.8
Do.	24-30	...	...	28 8	6.6	16.4	7.5	18.0
Do.	31-6	February	...	25 8	6.3	16.1	6.2	15.5
February	7-13	...	...	18 0	...	...	7.1	15.5
Do.	14-20	...	...	11 4	...	...	7.7	17.0
Do.	21-27	...	...	9 0	...	...	5.2	13.5
Do.	28-5	March	...	3 4	...	...	6.3	16.1
May	4-7	...	...	43 12	7.1	16.9	6.7	16.4
Do.	8-14	...	...	78 4	5.8	15.4	6.1	15.3
Do.	15-21	...	...	69 8	7.5	17.8	6.9	16.4
Do.	22-28	...	...	76 0	5.8	15.8	6.3	16.1
Do.	29-4	June	...	48 4	5.6	14.7	6.9	16.4
June	5-11	...	...	49 0	4.8	13.5	5.9	15.3
Do.	12-18	...	...	97 8	6.9	16.9	6.7	16.6
Do.	19-25	...	...	99 12	6.3	15.5	6.6	15.3
Do.	26-2	July	...	106 8	6.7	16.1	6.5	15.9
July	3-9	...	...	108 8	6.5	14.9	6.8	16.2
Do.	10-16	...	...	95 4	5.9	14.8	6.2	15.8
Do.	17-23	...	...	93 12	6.4	15.1	6.6	15.3
Do.	24-30	...	...	93 4	6.1	15.52	6.4	16.1
Do.	31-6	August	...	87 12	6.2	15.6	6.6	15.6
August	7-13	...	...	88 8	7.4	16.6	7.8	17.4
Do.	14-20	...	...	94 8	...	...	...	...
Do.	21-27	...	...	87 4	...	...	...	...
Do.	28-3	September	...	85 12	...	...	...	...
September	4-10	...	...	82 8	4.8	13.8	5.4	14.9
Do.	11-17	...	...	85 0	5.7	15.2	5.3	13.8
Do.	18-24	...	...	87 8	6.2	15.9	6.4	14.3
Do.	24-1	October	...	77 4	6.2	15.3	7.4	16.5
October	2-8	...	...	83 8	6.3	15.8	7.3	16.6
Do.	9-15	...	...	87 8	7.3	17.0	7.6	16.4
Do.	16-22	...	...	85 12	5.8	14.7	6.4	15.4
Do.	23-29	...	...	64 12	6.1	15.3	5.4	14.9
Do.	30-5	November	...	76 12	6.1	15.0	6.5	16.1
November	6-12	...	...	79 12	...	...	...	...
Do.	13-19	...	...	75 12	6.3	15.8	6.8	15.8
Do.	20-26	...	...	72 12	6.4	15.4	6.5	15.4
Do.	27-3	December	...	69 0	...	...	...	...

SIND COW--No. 6 (BHASMI).

Dates of calving, February 14th, 1907, and April 1st, 1908.
In milk until February 28th, 1908.

ANALYSIS OF MILK.									
DATE,				Yield of milk for the week.	MORNING MILK.		EVENING MILK.		
					Fat.	Total solids.	Fat.	Total solids.	
1907.				lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.	
September	20	...	...	...	5.4	15.0	7.0	16.0	
Do.	20-26	...	...	79 12	4.8	14.3	6.6	15.6	
Do.	27-3	October	...	77 8	5.4	14.2	6.5	15.4	
October	4-10	...	...	71 8	5.4	14.5	6.2	15.1	
Do.	11-17	...	...	73 8	5.7	15.3	6.8	15.8	
Do.	18-24	...	...	71 8	4.7	15.1	5.4	15.0	
Do.	25-31	...	...	76 8	4.6	14.0	5.5	15.3	
November	1-7	...	...	65 4	5.5	15.0	6.8	16.3	
Do.	8-14	...	...	64 8	4.8	14.2	6.9	16.2	
Do.	15-21	...	...	58 4	5.6	15.1	6.5	15.8	
Do.	22-28	...	...	57 12	5.8	15.2	6.8	15.7	
Do.	29-5	December	...	58 12	6.5	15.9	7.4	16.9	
December	6-12	...	...	57 0	6.8	16.2	7.8	16.9	
Do.	13-19	...	...	52 4	5.7	14.7	6.8	15.5	
Do.	20-26	...	...	51 0	...	...	...	...
1908.									
December	27-2	January	...	47 8	...	...	...	...
January	3-9	...	...	46 8	7.1	16.5	7.5	16.6	
Do.	10-16	...	...	40 0	7.5	16.9	7.7	17.2	
Do.	17-23	...	...	42 0	6.6	15.8	8.0	18.1	
Do.	24-30	...	...	37 0	6.7	16.0	7.4	16.4	
Do.	31-6	February	...	33 8	6.4	15.7	7.9	17.6	
February	7-13	...	...	35 4	7.4	16.9	8.0	17.0	
Do.	14-20	...	...	26 0	6.9	16.3	7.3	17.1	
Do.	21-27	...	...	13 12	6.7	15.4	...	...
April	2	...	...	...	7.3	18.02	8.5	91.2	
Do.	3-9	...	...	92 12	5.2	15.5	5.8	16.0	
Do.	10-16	...	...	89 12	7.9	17.2	8.8	18.2	
Do.	17-23	...	...	97 8	...	...	6.2	15.8	
Do.	24-30	...	...	108 4	...	...	8.6	48.4	
May	1-7	...	...	110 0	...	...	6.4	16.2	
Do.	8-14	...	...	117 0	6.7	16.8	6.6	16.4	
Do.	15-21	...	...	123 8	4.9	14.4	6.3	15.7	
Do.	22-28	...	...	113 8	5.2	15.1	5.7	14.7	
Do.	29-4	June	...	107 8	6.3	13.8	6.6	16.6	
June	5-11	...	...	104 4	6.1	15.2	6.6	15.8	
Do.	12-18	...	...	104 4	6.2	15.9	6.5	16.1	
Do.	19-25	...	...	105 8	5.8	15.4	6.3	15.8	
Do.	26-2	July	...	98 8	5.9	15.5	6.0	15.6	

SIND COW—No. 6 (BHASMI)—*contd.*

Dates of calving, February 14th, 1907, and April 1st, 1908.

In milk until February 28th, 1908.

ANALYSIS OF MILK.									
DATE.		Yield of milk for the week.		MORNING MILK.		EVENING MILK.			
				Fat.	Total solids.	Fat.	Total solids.		
1908.		lbs.	ozs.	Per cent.	Per cent.	Per cent.	Per cent.		
July	3-9	...	...	94	0	5.9	14.8	6.4	15.8
Do.	10-16	...	...	97	12	4.8	14.0	5.2	15.0
Do.	17-23	...	...	82	4	6.8	15.9	6.7	16.6
Do.	24-30	...	...	87	0	5.9	15.0	5.2	14.5
Do.	31-6	August	...	81	0	4.9	14.3	5.6	14.5
August	7-13	...	...	87	0	7.0	17.0	7.3	16.9
Do.	14-20	...	...	98	0	...	...	...	...
Do.	21-27	...	...	90	0	...	...	...	...
Do.	28-3	September	...	85	0	...	...	...	...
September	4-10	...	...	81	8	5.7	14.5	5.9	15.8
Do.	11-17	...	...	81	0	6.3	15.2	6.5	16.4
Do.	18-24	...	...	63	8	5.9	15.7	6.2	15.3
Do.	25-1	October	...	67	4	5.9	15.0	6.1	14.8
October	2-8	...	...	71	0	5.4	14.9	6.8	15.5
Do.	9-15	...	...	69	8	6.5	15.6	6.4	15.6
Do.	16-22	...	...	68	4	6.4	15.9	5.9	14.7
Do.	23-29	...	...	63	12	5.9	15.0	4.9	13.6
Do.	30-5	November	...	60	8	5.7	14.6	5.8	14.8
November	6-12	...	...	58	0	...	...	...	...
Do.	13-19	...	...	49	4	6.6	16.1	7.2	16.5
Do.	20-26	...	...	50	4	4.8	13.0	7.2	16.4
Do.	27-3	December	...	52	4	...	...	...	...

SIND COW—No. 7 (PITAMBARI).

Dates of calving, December 9th, 1906, and February 9th, 1908.

In milk until the end of the experiment.

ANALYSIS OF MILK.								
DATE.			Yield of milk for the week.		MORNING MILK.		EVENING MILK.	
					Fat.	Total solids.	Fat.	Total solids.
1907.			lbs.	ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	20	...	...	...	4.3	12.7	5.4	13.7
Do.	20-26	...	...	50 8	4.5	13.2	6.3	15.5
Do.	27-3	October	...	53 12	4.4	12.8	4.3	12.8
October	4-10	...	...	50 0	3.9	12.9	3.2	11.7
Do.	11-17	...	...	49 8	4.2	13.2	5.9	14.3
Do.	18-24	...	...	47 0	4.1	12.8	4.3	12.9
Do.	25-31	...	...	47 8	3.9	12.8	4.7	13.4
November	1-7	...	...	41 8	4.1	15.2	4.8	13.8
Do.	8-14	...	...	40 8	3.7	12.6	4.1	12.9
Do.	15-21	...	...	36 4	4.9	13.6	4.6	13.2
Do.	22-28	...	...	36 4	4.9	13.6	3.9	11.9
Do.	29-5	December	...	34 4	5.1	13.6	5.3	15.1

SIND COW—No. 7 (PITAMBARI)—*contd.*

Dates of calving, December 9th, 1906, and February 9th, 1908.

In milk until the end of the experiment.

ANALYSIS OF MILK.

DATE.		Yield of milk for the week.		MORNING MILK.		EVENING MILK.	
				Fat.	Total solids.	Fat.	Total solids.
		lbs.	ozs.	Per cent.	Per cent.	Per cent.	Per cent.
1907.							
December	6-12	...	...	33	8	6.8	16.8
Do.	13-19	...	...	33	4	4.1	12.6
Do.	20-26	...	...	28	4	...	...
Do.	27-2	January	...	24	4	...	...
1908.							
January	3-9	...	...	22	8	6.2	15.2
Do.	10-16	...	...	17	0	5.3	13.9
Do.	17-23	...	...	14	12	5.3	14.9
Do.	24-30	...	...	10	4	5.7	15.3
Do.	31-6	February	...	6	4	...	...
February	14-20	...	...	94	0	...	6.0
Do.	21-27	...	...	113	0	5.1	13.1
Do.	28-5	March	...	131	0	4.5	13.9
March	6-12	...	...	135	6	4.5	14.0
Do.	13-19	...	...	118	8	5.8	15.2
Do.	20-26	...	...	104	8	5.4	14.5
Do.	27-2	April	...	100	12	5.9	15.1
April	3-9	...	...	110	8	5.7	15.2
Do.	10-16	...	...	126	12	6.2	15.0
Do.	17-23	...	...	126	4	5.2	14.6
Do.	24-30	...	...	133	4	6.8	16.5
May	1-7	...	...	146	4	5.4	14.4
Do.	8-14	...	...	155	4	5.5	15.2
Do.	15-21	...	...	163	0	6.2	15.7
Do.	22-28	...	...	158	8	5.6	15.7
Do.	29-4	June	...	129	0	4.9	13.9
June	5-11	...	...	128	0	6.3	15.6
Do.	12-18	...	...	122	0	6.1	15.9
Do.	19-25	...	...	131	0	5.7	15.5
Do.	26-2	July	...	130	12	5.7	15.0
July	3-9	...	...	120	0	5.7	14.6
Do.	10-16	...	...	120	12	6.3	15.6
Do.	17-23	...	...	122	4	6.3	15.8
Do.	24-30	...	...	122	8	5.8	15.5
Do.	31-6	August	...	117	8	4.8	13.8
August	7-13	...	...	119	4	6.1	15.7
Do.	14-20	...	...	98	4	...	...
Do.	21-27	...	...	111	8	...	...
Do.	28-3	September	...	102	4	...	...
September	4-10	...	...	85	0	6.3	15.3
Do.	11-17	...	...	88	4	6.7	16.2
Do.	18-24	...	...	105	12	6.7	16.7
Do.	25-1	October	...	82	8	7.3	16.5
October	2-8	...	...	82	12	4.8	14.3
Do.	9-15	...	...	77	4	6.2	15.6
Do.	16-22	...	...	80	12	7.8	18.00
Do.	23-29	...	...	71	8	5.4	13.7
Do.	30-5	November	...	72	4	6.3	15.7
November	6-12	...	...	62	12	...	...
Do.	13-19	...	...	59	4	5.8	14.7
Do.	20-26	...	...	58	8	5.5	13.9
Do.	27-3	December	...	55	0	...	...

SIND COW—No. 8. (PRL.)

Dates of calving—December 8th, 1906, and November 5th, 1907.

In milk until the end of the experiment.

ANALYSIS OF MILK.

DATE.	Yield of milk for the week.	MORNING MILK.		EVENING MILK.	
		Fat.	Total solids.	Fat.	Total solids.
1907.	lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September 20	...	6.5	16.4	7.2	15.3
Do. 20-26	9 8	7.8	16.9		
Do. 27-3 October	7 4	7.3	16.0		
October 4-10	...	6.9	15.8		
November 5-7	45 8	4.9	14.6	4.9	14.6
Do. 8-14	121 0	6.9	16.5	5.9	15.1
Do. 15-21	109 0	5.7	14.2	5.4	13.9
Do. 22-28	86 4	4.2	13.4	6.6	15.3
Do. 29-5 December	88 12	7.3	17.0	4.3	14.0
December 6-12	78 0	4.9	14.3	5.6	15.0
Do. 13-19	69 4	6.7	16.4	5.7	14.4
Do. 20-26	84 0				...
1908.					
December 27-2 January	81 0				
January 3-9	82 8	5.8	4.5	6.3	15.6
Do. 10-16	160 4	3.4	11.5	5.3	14.4
Do. 17-23	96 4	4.6	13.8	5.5	15.0
Do. 24-30	83 12	4.6	13.8	4.5	14.3
Do. 31-6 February	88 0	4.5	13.7	5.6	15.5
February 7-13	92 12	4.8	14.9	5.0	14.5
Do. 14-20	86 0	5.1	15.0	5.1	15.0
Do. 21-27	78 12	6.6	16.1	6.9	16.0
Do. 28-5 March	81 8	5.9	14.8	5.8	15.2
March 6-12	92 8	7.3	17.0	6.3	15.6
Do. 13-19	88 8	7.5	16.8	5.9	14.7
Do. 20-26	89 12	5.2	14.6	5.6	15.0
Do. 27-2 April	81 12	5.6	14.9	5.8	15.2
April 3-9	84 0	6.5	16.2	6.1	15.1
Do. 10-16	89 4	6.3	15.3	6.4	15.8
Do. 17-23	80 0	5.9	16.0	6.5	15.9
Do. 24-30	82 0	6.5	16.6	6.7	16.4
May 1-7	83 8	7.1	17.4	7.4	17.1
Do. 8-14	84 0	5.8	15.3	6.3	15.9
Do. 15-21	84 4	6.8	16.5	7.4	19.3
Do. 22-28	78 8	6.8	16.5	7.5	17.1
Do. 29-4 June	74 4	6.1	15.1	6.5	16.1
June 5-11	81 0	5.2	14.0	6.0	14.5
Do. 12-18	73 8	6.9	16.2	7.2	16.3
Do. 19-25	72 4	5.4	14.6	5.7	13.9
Do. 26-2 July	71 4	6.3	15.8	6.5	16.2
July 3-9	66 4	6.8	15.3	7.0	16.5
Do. 10-16	64 4			6.0	15.0
Do. 17-23	61 12	6.7	16.8	6.9	16.0
Do. 24-30	63 4	5.6	14.7	5.9	15.3
Do. 31-6 August	57 4	6.1	15.9	6.1	15.6
August 7-13	62 12	5.0	14.1	5.2	14.5
Do. 14-20	55 4				
Do. 21-27	52 4				
Do. 28-3 September	53 4				

SIND COW—No. 8. (PARI)—*contd.*

Dates of calving--December 8th, 1906, and November 5th, 1907.

In milk until the end of the experiment.

ANALYSIS OF MILK.						
DATE.		Yield of milk for the week.	MORNING MILK.		EVENING MILK.	
			Fat.	Total solids.	Fat.	Total solids.
		lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	4-10	54 12	6.6	15.6	7.1	15.7
Do.	11-17	52 8	6.4	16.3	6.8	15.6
Do.	18-24	49 12	6.1	15.7	5.9	15.8
Do.	25-1	43 12	6.2	15.3	5.9	15.1
October	2-8	45 12	5.2	14.9	5.9	15.2
Do.	9-15	17 12	6.8	16.5	7.2	16.3
Do.	16-22	43 4	7.6	17.9	5.5	15.1
Do.	23-29	45 4	7.2	16.1	6.2	14.9
Do.	30-5	42 4	5.9	15.6	6.3	15.0
November	6-12	40 8	...	...	...	...
Do.	13-19	37 0	5.9	15.0	5.9	14.7
Do.	20-26	36 8	5.7	15.1	4.7	13.7
Do.	27-3	30 8	...	...	...	...
	December					

SIND COW—No. 9. (ZANKAR.)

Dates of calving--November 27th, 1906, and September 6th, 1908.

In milk, until September 4th, 1908.

ANALYSIS OF MILK.						
DATE.	Yield of milk for the week.	MORNING MILK.		EVENING MILK.		
		Fat.	Total solids.	Fat.	Total solids.	
		Per cent.	Per cent.	Per cent.	Per cent.	
1907.	lbs. ozs.					
September 20		5.5	14.4	5.9	15.0	
Do. 20-26		5.6	14.5	7.2	15.7	
Do. 27-3	October	4.3	13.5	5.7	14.1	
October 4-10		4.8	14.2	6.3	15.0	
Do. 11-17		5.9	15.0	4.0	13.2	
Do. 18-24		4.4	13.0	5.7	14.7	
Do. 25-31		4.5	13.9	5.9	15.1	
November 1-7		4.6	14.1	4.4	13.8	
Do. 8-14		5.3	14.8	4.6	14.1	
Do. 15-21		5.2	14.3	4.8	14.4	
Do. 22-28		4.2	13.5	4.0	13.2	
Do. 29-5	December	4.6	13.9	4.2	13.5	
December 6-12		3.6	12.8	4.5	13.8	
Do. 13-19		5.2	14.6	5.0	14.8	
Do. 20-26			...		...

SIND COW—No. 9. (ZANKAR)—*contd.*

Dates of calving—November 27th, 1906, and September 6th, 1908.

In milk, until September 4th, 1908.

ANALYSIS OF MILK.							
DATE.		Yield of milk for the week.	MORNING MILK.		EVENING MILK.		
			Fat.	Total solids.	Fat.	Total solids.	
		lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.	
1908.							
December	27-2 January	126 0					
January	3-9	130 12	4.8	14.1	5.1	14.6	
Do.	10-16	131 0	4.5	13.8	4.7	14.1	
Do.	17-23	113 4	5.2	14.6	5.2	14.6	
Do.	24-30	118 4	5.3	14.9	5.1	14.9	
Do.	31-6 February	120 12	4.7	14.4	5.3	15.4	
February	7-13	123 1	5.1	15.0	4.6	13.9	
Do.	14-20	122 4	5.0	14.9	5.5	15.2	
Do.	21-27	115 12	4.8	15.1	4.2	13.7	
Do.	28-5 March	114 0	5.1	14.5	4.5	14.5	
March	6-12	109 12	5.4	14.9	4.9	14.5	
Do.	13-19	108 1	5.1	14.5	5.1	15.0	
Do.	20-26	105 12	6.1	15.6	5.0	13.9	
Do.	27-2 April	95 4	6.2	15.7	5.7	14.5	
April	3-9	96 12	4.8	14.0	5.5	14.9	
Do.	10-16	88 12	6.0	14.8	6.0	15.2	
Do.	17-23	100 12	6.6	17.9	6.3	15.6	
Do.	24-30	103 4	6.2	16.3	5.9	15.5	
May	1-7	104 0	5.6	15.7	5.1	14.3	
Do.	8-14	108 12	5.7	15.7	5.9	15.6	
Do.	15-21	106 8	6.4	16.6	5.9	15.0	
Do.	22-28	98 0	6.0	16.0	5.2	14.6	
Do.	29-4 June	97 1	5.3	14.4	6.1	15.0	
June	5-11	92 0	4.9	14.1	6.2	15.5	
Do.	12-18	88 12	6.3	14.8	5.9	15.1	
Do.	19-25	86 8	6.4	16.2	6.4	15.4	
Do.	26-2 July	81 8	6.5	15.7	6.3	15.3	
July	3-9	83 8	6.2	15.1	6.2	15.3	
Do.	10-16	67 12	4.9	13.9	5.7	14.4	
Do.	17-23	71 0	5.2	14.0	5.7	14.5	
Do.	24-30	55 12	5.3	14.5	5.4	15.0	
Do.	31-6 August	62 8	6.3	15.9	6.0	15.2	
August	7-13	60 0	5.3	14.7	5.5	15.0	
Do.	14-20	53 4					
Do.	21-27	41 0					
Do.	28-3 September	20 0					

SIND COW—No. 10. (KHILARI.)

Date of calving—March 17th, 1907.

In milk, until April 2nd, 1908.

ANALYSIS OF MILK.

DATE.		Yield of milk for the week.	MORNING MILK.		EVENING MILK.	
			Fat.	Total solids.	Fat.	Total solids.
1907.		lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	20		7.2	17.5	—	17.1
Do.	20-26	49 8	6.4	16.6	8.0	18.0
Do.	27-3 October	49 4	7.2	17.2	5.7	14.7
October	4-10	46 0	7.0	14.3	7.0	17.0
Do.	11-17	48 8	6.9	17.4	7.1	17.3
Do.	18-24	49 4	6.7	16.7	7.7	18.5
Do.	25-31	50 12	6.6	17.1	7.8	18.0
November	1-7	45 8	6.9	17.4	7.8	17.7
Do.	8-14	48 8	6.3	15.9	7.5	17.5
Do.	15-21	41 4	6.4	16.3	6.9	16.8
Do.	22-28	41 12	6.8	17.3	7.2	17.1
Do.	29-5 December	37 8	4.6	14.3	7.2	17.3
December	6-12	37 4	7.6	17.6	8.7	19.1
Do.	13-19	35 0	7.1	16.9	7.5	17.0
Do.	20-26	35 12			..	..
1908.						
December	27-2 January	35 8			...	
January	3-9	36 12				
Do.	10-16	37 8	7.5	16.3	8.7	18.4
Do.	17-23	38 8	4.4	13.7	7.7	17.3
Do.	24-30	35 8	5.5	15.0	6.8	16.7
Do.	31-6 February	35 0	6.6	15.8	8.6	18.8
February	7-13	35 4	7.5	18.0	7.5	17.5
Do.	14-20	34 0	7.3	17.5	8.1	19.2
Do.	21-27	73 4	7.3	17.9	8.4	19.1
Do.	28-5 March	92 4	5.3	15.1	5.1	14.9
March	6-12	100 12	7.1	17.4	6.2	16.2
Do.	13-19	104 12	6.7	17.5	6.2	16.2
Do.	20-26	87 8	5.0	14.0	6.3	15.6

SIND COW—No. 11. (SONI.)

Date of calving, May 31st, 1907.

In milk until June 8th, 1908.

ANALYSIS OF MILK.

DATE.	Yield of milk for the week.	ANALYSIS OF MILK.			
		MORNING MILK.		EVENING MILK.	
		Fat.	Total solids.	Fat.	Total solids.
1907.		lbs. ozs.	Per cent.	Per cent.	Per cent.
September 20	...	95 8	4.8	14.0	4.2
Do. 20-26	...	89 12	4.7	14.1	4.9
Do. 27-3	October	...	5.3	15.6	5.1
October 4-10	...	78 8	4.7	14.3	5.4
Do. 11-17	...	77 4	4.5	13.8	5.1
Do. 18-24	...	87 4	4.9	14.0	5.1
Do. 25-31	...	94 8	4.4	13.7	5.2
November 1-7	...	86 4	4.4	14.0	5.2
Do. 8-14	...	86 12	4.5	14.0	4.0
Do. 15-21	...	76 8	4.7	14.0	5.0
Do. 22-28	...	74 12	4.6	13.8	5.0
Do. 29-5	December	71 0	4.2	13.5	5.0
December 6-12	...	72 12	4.6	14.8	5.1
Do. 13-19	...	68 0	4.8	14.0	5.4
Do. 20-26	...	66 0	...	...	...
Do. 27-2	January	66 0	...	...	...
1908.					
January 3-9	...	67 12	5.3	14.5	6.3
Do. 10-16	...	70 12	4.2	12.6	5.2
Do. 17-23	...	70 4	4.5	13.8	5.1
Do. 24-30	...	72 0	5.1	14.6	5.5
Do. 31-6	February	67 12	5.1	14.4	5.6
February 7-13	...	71 4	5.8	16.3	6.0
Do. 14-20	...	61 8	6.2	16.2	5.9
Do. 21-27	...	62 8	5.1	14.4	5.2
Do. 28-5	March	63 8	4.2	13.5	4.9
March 6-12	...	63 4	6.1	15.7	5.5
Do. 13-19	...	60 12	8.3	18.2	5.7
Do. 20-26	...	60 8	4.5	13.8	5.5
Do. 27-2	April	54 0	5.9	15.1	6.4
April 3-9	...	51 8	5.7	15.5	6.2
Do. 10-16	...	50 0	6.3	15.3	6.5
Do. 17-23	...	53 12	6.8	15.9	7.0
Do. 24-30	...	44 4	5.8	15.0	6.2
May 1-7	...	41 4	5.2	14.4	5.7
Do. 8-14	...	36 4	7.4	17.5	8.3
Do. 15-21	...	26 12	5.4	15.1	7.2
Do. 22-28	...	24 8	5.7	14.5	6.1
Do. 29-4	June	18 4	5.5	14.5	5.7
June 5-11

SIND COW—No. 12. (MOHAN.)

Dates of calving, March 23rd, 1907, and April 17th, 1908.

In milk until April 12th, 1908.

DATE.		Yield of milk for the week.		ANALYSIS OF MILK.			
				MORNING MILK.		EVENING MILK.	
				Fat.	Total solids.	Fat.	Total solids.
1907.		lbs.	ozs.	Per cent.	Per cent.	Per cent.	Per cent.
September	20 ...	...	...	5.8	15.1	4.6	13.4
Do.	20-26	64	4	5.2	14.5	5.1	14.1
Do.	27-3 October	62	12	4.4	13.3	4.1	12.8
October	4-10	60	8	2.9	12.1	4.6	13.6
Do.	11-17	59	12	5.0	14.3	5.3	14.3
Do.	18-24	68	12	4.3	13.3	5.3	14.3
Do.	25-31	60	8	4.2	13.5	5.8	14.9
November	1-7	56	0	4.8	14.1	5.6	14.9
Do.	8-14	55	4	5.3	14.6	5.3	14.7
Do.	15-21	52	8	6.0	15.2	5.6	14.7
Do.	22-28	46	0	4.8	14.1	4.8	14.0
Do.	29-5 December	42	0	5.5	14.9	5.9	15.3
December	6-12	45	8	4.8	14.1	5.7	15.1
Do.	13-19	47	8	5.3	14.4	6.5	15.6
Do.	20-26	46	4	...	...	...	...
Do.	27-2 January	41	4	...	...	...	...
1908.							
January	3-9	40	12	7.3	17.0	7.9	15.9
Do.	10-16	40	0	5.5	14.5	5.5	14.8
Do.	17-23	39	4	6.2	15.7	5.2	15.4
Do.	24-30	36	8	6.2	15.7	6.3	15.8
Do.	31-6 February	35	0	6.1	15.8	6.1	15.9
February	7-13	34	12	5.5	14.9	6.1	15.2
Do.	14-20	34	8	5.7	15.2	5.8	15.0
Do.	21-27	29	4	5.6	14.9	6.2	16.0
Do.	28-5 March	27	4	6.6	16.4	6.3	16.1
March	6-12	24	12	4.9	14.8	7.3	17.9
Do.	13-19	25	8	7.2	16.9	6.8	16.5
Do.	20-26	36	8	5.4	15.0	5.3	14.4
Do.	27-2 April	46	8	6.6	16.5	7.2	17.0
April	3-9	62	0	7.1	17.0	7.8	15.6
		Calved on April 17th.					
Do.	10-16	79	0	6.5	15.8	6.9	16.6
Do.	17-23	82	0	6.3	15.6	6.8	16.4
Do.	24-30	106	12	6.7	16.2	7.2	16.9
May	1-7	112	4	6.6	16.3	7.2	16.9
Do.	8-14	113	0	6.6	16.4	6.8	16.2
Do.	15-21	100	0	4.9	14.3	6.9	16.6
Do.	22-28	97	4	7.1	16.4	6.8	16.7
Do.	29-4 June	95	8	6.4	15.8	6.9	16.4

SIND COW—No. 12. (MOHAN)—*contd.*

Dates of calving, March 23rd, 1907, and April 17th, 1908.

In milk until April 12th, 1908.

ANALYSIS OF MILK.

DATE.		Yield of milk for the week.	MORNING MILK.		EVENING MILK.		
			Fat.	Total solids.	Fat.	Total solids.	
1897.		lbs. ozs.	Per cent.	Per cent.	Per cent.	Per cent.	
June	5-11	...	92 12	6.5	15.7	6.5	15.8
Do.	12-18	...	91 4	6.8	16.7	6.8	16.3
Do.	19-25	...	92 0	6.7	16.2	6.4	15.1
Do.	26-2	July	101 4	5.1	14.3	5.8	14.6
July	3-9	...	95 8	5.6	14.2	5.8	14.4
Do.	10-16	...	104 4	5.5	14.6	6.1	15.5
Do.	17-23	...	102 4	5.8	15.1	6.4	15.9
Do.	24-30	...	98 0	6.7	15.8	6.4	15.6
Do.	31-6	August	82 8	6.6	15.4	6.7	16.8
August	7-13	...	81 0	6.3	15.6	6.8	16.5
Do.	14-20	...	90 0	...	...	...	...
Do.	21-27	...	70 12	...	...	...	...
Do.	28-3	September	73 8	...	...	...	...
September	4-10	...	80 12	6.2	14.7	6.6	15.6
Do.	11-17	...	74 8	6.8	15.7	7.1	16.5
Do.	18-24	...	77 0	6.5	15.9	6.7	16.4
Do.	25-1	October	65 0	5.1	13.6	4.5	12.8
October	2-8	...	68 12	5.2	14.3	5.3	13.6
Do.	9-15	...	68 8	6.4	15.7	7.5	16.9
Do.	16-22	...	66 0	5.5	15.4	8.4	18.6
Do.	23-29	...	65 8	5.6	15.0	6.8	16.6
Do.	30-5	November	65 4	5.8	14.7	7.2	16.5
November	6-12	...	60 8	...	...	...	...
Do.	13-19	...	57 8	6.0	15.3	5.7	14.9
Do.	20-26	...	58 0	4.9	13.1	7.2	16.3
Do.	27-3	December	57 0	...	...	...	...

APPENDIX II.

WEEKLY WEATHER ACCOUNT FROM SEPTEMBER 20TH, 1907, TO NOVEMBER 26TH, 1908.

TEMPERATURE IN SHADE.

Week ending	Maximum of the week.	Minimum of the week.	Mean of the week.	Mean Humidity of the week.	Total Rain- fall for the week.	REMARKS.
1907.	F.	F.	° F.	Per cent.	Inches.	
September 26	92.0	65.8	79.34	76.5	2.65	
October 3	89.5	65.8	77.95	85.14	4.22	
Do. 10	92.0	66.3	79.77	74.28	...	
Do. 17	95.0	64.8	80.63	69.0	...	
Do. 24	92.0	63.8	80.12	62.42	...	
Do. 31	90.0	56.8	76.37	60.0	...	
November 7	93.0	56.8	74.85	45.85	...	
Do. 14	91.0	53.8	73.27	42.85	...	
Do. 21	92.0	53.8	76.91	56.83	...	
Do. 28	92.0	49.8	72.42	55.42	...	
December 5	90.5	44.8	70.67	47.71	...	
Do. 12	88.0	44.8	66.53	45.28	...	
Do. 19	91.0	43.8	66.71	41.28	...	
Do. 26	87.0	46.3	67.85	41.14	...	
1908.						
January 2	84.5	48.8	66.57	47.85	...	
Do. 9	84.0	45.3	65.67	42.28	...	
Do. 16	85.0	46.8	66.00	60.14	...	
Do. 23	87.0	49.3	69.35	54.42	...	
Do. 30	90.0	49.8	70.45	55.0	...	
February 6	90.0	46.8	67.46	64.28	...	
Do. 13	95.0	47.8	70.41	36.28	...	
Do. 20	98.5	52.8	74.24	37.00	...	
Do. 27	95.5	49.8	74.48	35.71	...	
March 5	96.0	50.3	74.55	49.25	...	
Do. 12	97.0	54.8	76.48	30.28	...	
Do. 19	97.6	55.8	77.12	31.00	...	
Do. 26	99.0	64.3	82.17	31.57	...	
April 2	104.0	64.8	84.31	57.42	...	
Do. 9	103.5	65.3	83.95	37.00	0.46	
Do. 16	102.2	62.8	83.60	31.80	...	
Do. 23	106.0	65.8	85.46	51.16	0.14	
Do. 30	106.5	62.3	84.65	32.42	...	
May 7	107.5	69.8	87.16	50.50	...	
Do. 14	107.0	68.3	84.50	56.28	...	
Do. 21	101.5	68.3	84.17	48.57	...	
Do. 28	108.0	66.8	84.27	50.42	...	
June 4	97.0	70.3	83.68	69.14	...	
Do. 11	98.5	71.8	85.34	65.57	0.40	
Do. 18	96.0	69.8	81.31	78.57	0.83	
Do. 25	91.0	69.8	81.34	65.00	...	

TEMPERATURE IN SHADE.						
Week ending	Maximum of the week.	Minimum of the week.	Mean of the week.	Mean Humidity of the week.	Total Rain- fall for the week.	REMARKS.
1908.	F.	F.	F.	Per cent.	Inches.	
July 2	89.5	70.3	78.32	76.28	0.11	
Do. 9	83.0	69.8	76.31	81.00	1.71	
Do. 16	84.0	69.8	75.37	83.09	2.10	
Do. 23	80.5	69.3	74.62	87.5	0.50	
Do. 30	84.0	69.8	75.0	86.14	1.40	
August 6	81.0	69.3	73.48	87.71	2.17	
Do. 13	81.5	68.8	75.22	89.86	0.55	
Do. 20	82.9	64.3	73.95	86.0	0.80	
Do. 27	80.0	67.3	68.62	85.71	0.50	
September 3	85.0	67.3	76.11	79.14	0.21	
Do. 10	87.0	66.3	76.24	83.00	0.41	
Do. 17	87.5	64.8	76.98	82.57	0.52	
Do. 24	88.0	68.3	76.41	85.14	5.73	
October 1	90.0	63.8	78.12	79.42	0.03	
Do. 8	90.0	61.8	74.04	74.20		
Do. 15	98.0	61.3	79.14	72.00		
Do. 22	91.5	64.8	78.75	68.71	0.08	
Do. 29	92.5	62.8	78.30	67.00	0.12	
November 5	91.0	60.3	78.21	83.28	2.21	
Do. 12	94.0	56.8	74.42	66.28		
Do. 19	88.0	48.3	69.27	52.42		
Do. 26	84.4	46.3	65.98	38.57		

PUBLICATIONS OF THE IMPERIAL DEPARTMENT OF AGRICULTURE IN INDIA.

[TO BE HAD FROM MESSRS. THACKER, SPINK & CO., CALCUTTA.]

- Annual Report of the Imperial Department of Agriculture in India for the year 1904-05. Price, As. 12 or 1s. 2d.
- Report of the Imperial Department of Agriculture in India for the years 1905-06 and 1906-07. Price, As. 6 or 7d.
- Report of the Agricultural Research Institute and College, Pusa, including Report of the Imperial Cotton Specialist for the years 1907-09. Price, As. 4.
- Report on the Progress of Agriculture in India for the years 1907-09. Price, As. 6 or 7d.
- Proceedings of the Board of Agriculture in India, held at Pusa on the 6th January 1905 and following days (with Appendices). Price, As. 8 or 9d.
- Proceedings of the Board of Agriculture in India, held at Pusa on the 15th January 1906 and following days (with Appendices). Price, As. 12 or 1s. 2d.
- Proceedings of the Board of Agriculture in India, held at Cawnpur on the 18th February 1907 and following days (with Appendices). Price, Re. 1-2 or 1s. 6d.
- Proceedings of the Board of Agriculture in India, held at Pusa on the 17th February 1908 and following days (with Appendices). Price, As. 8 or 9d.
- Proceedings of the Board of Agriculture in India, held at Nagpur on the 15th February 1909 and following days (with Appendices). Price, As. 8 or 9d.
- Proceedings of the Board of Agriculture in India, held at Pusa on the 21st February 1910 and following days (with Appendices). Price, As. 8 or 9d.
- Standard Curriculum for Provincial Agricultural Colleges as recommended by the Board of Agriculture, 1908. Price, As. 4 or 5d.
- The "*Agricultural Journal of India*." A Quarterly Journal dealing with subjects connected with field and garden crops, economic plants and fruits, soils, manures, methods of cultivation, irrigation, climatic conditions, insect pests, fungus diseases, co-operative credit, agricultural cattle, farm implements and other agricultural matters in India. Illustrations, including coloured plates, form a prominent feature of the Journal. It is edited by the Inspector-General of Agriculture in India, assisted by an Advisory Committee of the staff of the Agricultural Research Institute, Pusa. *Annual Subscription*, Rs. 6 or 8s. ; *Single copy*, Rs. 2.

MEMOIRS OF THE DEPARTMENT OF AGRICULTURE IN INDIA are issued from time to time as matter is available, in separate series, such as Chemistry, Botany, Entomology and the like.

BOTANICAL SERIES.

- Vol. I, No. 1. The Haustorium of *Santalum Album*—Early Stages by C. A. BARBER, M.A., F.L.S. Price, Re. 1.
- Part II.—The Structure of the Mature Haustorium and Inter-relation between Host and Parasite by C. A. BARBER, M.A., F.L.S. Price, Rs. 3.

BOTANICAL SERIES—(continued).

- Vol. I, No. II. Indian Wheat Rusts by E. J. BUTLER, M.B., F.L.S. ; and J. M. HAYMAN. Price, Rs. 3.
- Vol. I, No. III. Fungus Diseases of Sugar-cane in Bengal by E. J. BUTLER, M.B., F.L.S. Price, Rs. 3.
- Vol. I, No. IV. *Gossypium Obtusifolium*, Roxburgh, by I. H. BURKILL, M.A. Price, Re. 1.
- Vol. I, No. V. An Account of the Genus *Pythium* and some *Chytridiaceæ* by E. J. BUTLER, M.B., F.L.S. Price, Rs. 4-8.
- Vol. I, No. VI. *Cephaleuros Virescens*, Kunze ; The Red Rust of Tea by HAROLD H. MANN, D.Sc. ; and C. M. HUTCHINSON, B.A. Price, Rs. 4.
- Vol. II, No. I. Some Diseases of Cereals caused by *Sclerospora Graminicola* by E. J. BUTLER, M.B., F.L.S. Price, Re. 1-8.
- Vol. II, No. II. The Indian Cottons by G. A. GAMMIE, F.L.S. Price, Rs. 7-8.
- Vol. II, No. III. Note on a Toxic Substance excreted by the Roots of Plants by F. FLETCHER, M.A., B.Sc. Price, Re. 1-8.
- Vol. II, No. IV. The Haustorium of *Olaæ Scandens* by C. A. BARBER, M.A., F.L.S. Price, Rs. 2-8.
- Vol. II, No. V. The Haustorium of *Cusjera Rheedii* by C. A. BARBER, M.A., F.L.S. Price, Rs. 2-8.
- Vol. II, No. VI. Some Experiments in the Hybridising of Indian Cottons by P. F. FYSON, B.A., F.L.S. Price, Re. 1-8.
- Vol. II, No. VII. The Varietal Characters of Indian Wheats by ALBERT HOWARD, M.A., F.L.S., and GABRIELLE L. C. HOWARD, M.A. Price, Re. 1.
- Vol. II, No. VIII. The Mulberry Disease caused by *Coryneum Mori* Nom. in Kashmir, with notes on other Mulberry Diseases by E. J. BUTLER, M.B., F.L.S. Price, Re. 1-8.
- Vol. II, No. IX. The Wilt Disease of Pigeon-Pea and the Parasitism of *Neocosmospora Vasinfecta*, Smith, by E. J. BUTLER, M.B., F.L.S. Price, Rs. 3.
- Vol. III, No. I. Studies in Indian Tobaccos, No. 1. The types of *Nicotina Rustica*, L., Yellow Flowered Tobacco by ALBERT HOWARD, M.A., A.R.C.S., F.L.S., and GABRIELLE L. C. HOWARD, M.A. Price, Re. 1.
- Vol. III, No. II. Studies in Indian Tobaccos, No. 2. The Types of *Nicotina Tabacum*, L., by ALBERT HOWARD, M.A., A.R.C.S., F.L.S. ; and GABRIELLE L. C. HOWARD, M.A. Price, Rs. 9.
- Vol. III, No. III. Studies in Indian Fibre Plants, No. I. On two varieties of Sann, *Crotalaria Juncea*, L., by ALBERT HOWARD, M.A., A.R.C.S., F.L.S. ; and GABRIELLE L. C. HOWARD, M.A. Price, Re. 1.
- Vol. III, No. IV. The Influence of Environment on the milling and baking qualities of Wheat in India, No. 1. The Experiments of 1907-08 and 1908-09. By ALBERT HOWARD, M.A., F.L.S. ; H. M. LEAKE, M.A., F.L.S. ; and GABRIELLE L. C. HOWARD, M.A. Price, Re. 1-8.
- Vol. III, No. V. The Bud-Rot of Palms in India by E. J. BUTLER, M.B., F.L.S. Price, Rs. 2.
- Vol. III, No. VI. The Economic Significance of Natural Cross-fertilization in India by ALBERT HOWARD, M.A., A.R.C.S., F.L.S. ; GABRIELLE L. C. HOWARD, M.A., and ABDUR RAHMAN KHAN. Price, Rs. 4-8.
- Vol. IV, No. I. Millets of the Genus *Setaria* by G. A. GAMMIE, F.L.S., Imperial Cotton Specialist. Price, Re. 1.
- Vol. IV, No. II. Studies in Indian Fibre Plants, No. 2 on Some New Varieties of *Hibiscus Cannabinus*, L., and *Hibiscus Subdariffa*, L., by ALBERT HOWARD, M.A., A.R.C.S., F.L.S. ; and GABRIELLE L. C. HOWARD, M.A. (In the Press.)
- Vol. IV, No. III. Notes on the Incidence and Effect of Sterility and Cross-fertilization in the Indian Cotton by H. M. LEAKE, M.A. (Cantab.), F.L.S., and RAM PROSHAD. (In the Press.)
- Vol. IV, No. IV. Note on the Inheritance of Red Colour and the regularity of self-fertilization in the *Corchorus Capsularis*, the common Jute plant, by I. H. BURKILL, M.A., and R. S. FINLOW, B.Sc., F.C.S. (In the Press.)

CHEMICAL SERIES.

- Vol. I, No. I. The Composition of Indian Rain and Dew by J. WALTER LEATHER, Ph.D., F.C.S. Price, Re. 1.
- Vol. I, No. II. The Composition of Oil Seeds by J. W. LEATHER, Ph.D., F.C.S. Price, Re. 1.
- Vol. I, No. III. The Pot-Culture House at the Agricultural Research Institute, Pusa, by J. W. LEATHER, Ph.D., F.C.S. Price, Rs. 3.
- Vol. I, No. IV. Experiments on the Availability of Phosphates and Potash in Soils by J. W. LEATHER, Ph.D., F.C.S. Price, Re. 1-8.
- Vol. I, No. V. Construction of Drain Gauges at Pusa by M. H. ARNOTT, M.INST.C.E., with a Preface by J. W. LEATHER, Ph.D., F.C.S. Price, Rs. 3.
- Vol. I, No. VI. The Loss of Water from Soil during Dry Weather by J. WALTER LEATHER, Ph.D., F.I.C., F.C.S. Price, Rs. 2.
- Vol. I, No. VII. The System Water, Calcium Carbonate, Carbonic Acid by J. WALTER LEATHER, Ph.D., F.I.C., F.C.S., and JATINDRA NATH SEN, M.A., F.C.S. Price, Re. 1.
- Vol. I, No. VIII. Water Requirement of Crops in India by J. WALTER LEATHER, Ph.D., F.I.C., F.C.S. Price, Rs. 3.
- Vol. I, No. IX. The Nature of the Colour of Black Cotton Soil by H. E. ANNETT, B.Sc. (Lond.), F.C.S., M.S.E.A.C. Price, Re. 1.
- Vol. I, No. X. Water Requirements of Crops in India—II, by J. WALTER LEATHER, Ph.D., F.I.C., Imperial Agricultural Chemist. Price, Rs. 2-8.
- Vol. II, No. I. The Composition of Milk of some Breeds of Indian Cows and Buffaloes and its Variation, Part I, by A. A. MCGITT, B.Sc. (Lond.), F.C.S., and H. H. MANN, D.Sc. (*In the Press.*)

ENTOMOLOGICAL SERIES.

- Vol. I, No. I. The Bombay Locust by H. M. LEFROY, M.A., F.E.S., F.Z.S. Price, Rs. 2-3.
- Vol. I, No. II. The more important Insects injurious to Indian Agriculture by H. M. LEFROY, M.A., F.E.S., F.Z.S. Price, Rs. 3.
- Vol. I, No. III. The Indian Surface Caterpillars of the Genus *Agrotis* by H. M. LEFROY, M.A., F.E.S., F.Z.S., and C. C. GHOSH, B.A. Price, Re. 1-8.
- Vol. I, No. IV. Individual and Seasonal Variations in *Helopeltis Theivora*, Waterhouse, with description of a new species of *Helopeltis* by HAROLD H. MANN, D.Sc. Price, Re. 1.
- Vol. I, No. V. The Coccidæ attacking the Tea Plant in India and Ceylon by E. E. GREEN, F.E.S., and HAROLD H. MANN, D.Sc. Price, Re. 1.
- Vol. I, No. VI. The Mustard Sawfly by H. M. LEFROY, M.A., F.E.S., F.Z.S., and C. C. GHOSH, B.A. Price, Re. 1.
- Vol. II, No. I. The Rice Bug by H. M. LEFROY, M.A., F.E.S., F.Z.S. Price, Re. 1.
- Vol. II, No. II. Remarks on Indian Scale Insects (*Coccidæ*) by E. E. GREEN, F.E.S., F.Z.S. Price, Re. 1-8.
- Vol. II, No. III. The Red Cotton Bug by H. M. LEFROY, M.A., F.E.S., F.Z.S. Price, Re. 1.
- Vol. II, No. IV. The Castor Semi-Looper by H. M. LEFROY, M.A., F.E.S., F.Z.S. Price, Rs. 2.
- Vol. II, No. V. The Tobacco Caterpillar by H. M. LEFROY, M.A., F.E.S., F.Z.S. Price, Re. 1-8.
- Vol. II, No. VI. The Cotton Leaf-Roller by H. M. LEFROY, M.A., F.E.S., F.Z.S. Price, Re. 1-8.
- Vol. II, No. VII. Notes on Indian Scale Insects (*Coccidæ*) by H. MAXWELL-LEFROY, M.A., F.E.S., F.Z.S. Price, Re. 1-8.
- Vol. II, No. VIII. Life Histories of Indian Insects (*Coleoptera* I) by H. MAXWELL-LEFROY, M.A., F.E.S., F.Z.S. Price, Rs. 2.
- Vol. II, No. IX. Life Histories of Indian Insects—II. Some Aquatic *Rhynchota* and *Coleoptera*, by D. NOWROJEE, B.A., Assistant to the Imperial Entomologist. (*In the Press.*)
- Vol. II, No. X. Eri Silk by H. MAXWELL-LEFROY, Imperial Entomologist, and C. C. GHOSH, B.A., Assistant to the Imperial Entomologist. (*In the Press.*)

BULLETINS ISSUED BY THE AGRICULTURAL RESEARCH INSTITUTE, PUSA.

- No. 1. Notes on Cotton in Behar in 1904, by H. M. LEFROY, M.A., F.E.S., F.Z.S., Imperial Entomologist. Price, As. 4 or 6d.
- No. 2. An Outbreak of Cotton Pests in the Punjab, 1905, by H. M. LEFROY, M.A., F.E.S., F.Z.S., Imperial Entomologist. Price, As. 4 or 6d.
- No. 3. The Extension of Jute Cultivation in India by R. S. FINLOW, B.Sc., F.C.S., Jute Specialist to the Government of Eastern Bengal and Assam. Price, As. 12 or 1s. 6d.
- No. 4. First Report on the Fruit Experiments at Pusa by A. HOWARD, M.A. (Cantab.), A.R.C.S. (Lond.), F.C.S., F.L.S., Imperial Economic Botanist. Price, As. 6 or 6d.
- No. 5. Reports on Trials of the South African Locust Fungus in India by Dr. E. J. BUTLER, M.B., F.L.S., Imperial Mycologist, and H. M. LEFROY, M.A., F.E.S., F.Z.S., Imperial Entomologist. Price, As. 3 or 3d.
- No. 6. Ticks Infesting Domesticated Animals in India by C. WARBURTON, M.A., Zoologist to the Royal Agricultural Society of England. Price, As. 1 or 6d.
- No. 7. A Preliminary Account of the Biting Flies of India by H. M. LEFROY, M.A., F.E.S., F.Z.S., Imperial Entomologist. Price, Re. 1 or 1s. 6d.
- No. 8. Official and Recommended Methods for use in Chemical Laboratories of the Department of Agriculture in India by J. WALTER LEATHER, Ph.D., F.I.C., F.C.S., Imperial Agricultural Chemist. Price, As. 4 or 6d.
- No. 9. Report on Coconut Palm Disease in Travancore by Dr. E. J. BUTLER, M.B., F.L.S., Imperial Mycologist. Price, As. 4 or 6d.
- No. 10. Treatment and Observation of Crop Pests on the Pusa Farm by H. M. LEFROY, M.A., F.E.S., F.Z.S., Imperial Entomologist, and C. S. MISRA, B.A. Price, As. 6 or 7d.
- No. 11. On Flax Dodder by A. HOWARD, M.A., A.R.C.S., F.C.S., F.L.S., Imperial Economic Botanist. Price, As. 4 or 6d.
- No. 12. The Making and Care of Lawns in India by A. HOWARD, M.A., A.R.C.S., F.C.S., F.L.S., Imperial Economic Botanist. Price, As. 4 or 6d.
- No. 13. Sugarcane at the Partabgarh Experiment Station by C. CLARKE, F.I.C., Agricultural Chemist, United Provinces, and Khan Bahadur S. M. HADI, M.R.A.C., M.R.A.S., Assistant Director of Agriculture, United Provinces. Price, As. 4 or 6d.
- No. 14. The Milling and Baking Qualities of Indian Wheats by A. HOWARD, M.A., A.R.C.S., F.C.S., F.L.S., and GABRIELLE L. C. HOWARD, M.A. Price, As. 4 or 6d.
- No. 15. Note on the Extension of Cultivation of Fibre Plants in India. Price, As. 6 or 8d.
- No. 16. Second Report on the Fruit Experiments at Pusa by A. HOWARD, M.A. (Cantab.), A.R.C.S. (Lond.), F.L.S., Imperial Economic Botanist. Price, As. 6 or 8d.
- No. 17. The Milling and Baking Qualities of Indian Wheats No. 2 by A. HOWARD, M.A. (Cantab.), A.R.C.S. (Lond.), F.C.S., F.L.S., Imperial Economic Botanist, and GABRIELLE L. C. HOWARD, M.A., Associate and late Fellow of Newnham College, Cambridge. Price, As. 6 or 8d.
- No. 18. Report of the Outbreak of Blister-Blight on Tea in the Darjeeling District in 1908-09 by W. McRAE, M.A., B.Sc. Price, Re. 1 or 1s. 6d.
- No. 19. List of Names used in India for Common Insects, compiled by the Laboratory of the Imperial Entomologist, Pusa. (*In the Press.*)
- No. 20. Memorandum on Indian Wheat for the British Market by Sir JAMES WILSON, K.C.S.I. Price, As. 4 or 6d.
- No. 21. Memorandum regarding Leading Eucalyptus Suitable for India by F. BOOTH-TUCKER, Commissioner, Salvation Army, Simla. Price, As. 4 or 5d.
- No. 22. The Milling and Baking Qualities of Indian Wheats No. 3. "Some New Pusa Hybrids tested in 1910" by A. HOWARD, M.A. (Cantab.), A.R.C.S. (Lond.), F.L.S., Imperial Economic Botanist, and GABRIELLE L. C. HOWARD, M.A., Associate and late Fellow of Newnham College, Cambridge. (*In the Press.*)
- No. 23. Insecticides-Mixtures and Recipes for use against Insect, in the Field, the Orchard, the Garden and the House by H. MAXWELL LEFROY, M.A., F.E.S., F.Z.S., Imperial Entomologist. (*In the Press.*)
- No. 24. The Indian Saltpetre Industry by J. WALTER LEATHER, Ph.D., F.I.C., F.C.S., Imperial Agricultural Chemist and Babu JATINDRA NATH MUKHERJI, B.A., B.Sc., Second Assistant to the Imperial Agricultural Chemist. (*In the Press.*)

BOOKS.

- "Indian Insect Pests" by H. M. LEFROY, M.A., F.E.S., F.Z.S. Price, Re. 1-8.
- "Indian Insect Life" by H. M. LEFROY, M.A., F.E.S., F.Z.S., and F. M. HOWLETT, B.A. 786 pp. Price, Rs. 20.
- "Wheat in India" by A. HOWARD, M.A., A.R.C.S., F.E.S., and GABRIELLE L. C. HOWARD, M.A. 288 pp. Price, Rs. 5.